DOCUMENT RESUME

ED 333 675 EC 300 431

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TITLE	Six Units for Primary (K-2) Gifted/Talented Students. Self (Psychology), Plants (Botany), Animals (Zoology), Measurement (Mathematics), Space (Astronomy), Computers (Technology).
INSTITUTION	Education Service Center Region 7, Kilgore, Tex.
PUB DATE	88
NOTE	403p.
PUB TYPE	Guides - Classroom Use - Teaching Guides (For Teacher) (052)
EDRS PRICE	MF01/PC17 Plus Postage.
DESCRIPTORS	Animals; Computers; *Curriculum; Diagnostic Teaching; Experiential Learning; *Gifted; Learning Activities; Measurement; Plants (Botany); Primary Education; Self Concept; Space Sciences; *Student Educational Objectives; *Talent; *Teaching Methods

ABSTRACT

This curriculum for gifted/talented students in kindergarten through grade 2 focuses on the cognitive, affective, and psychomotor domains in the areas of language arts, mathematics, music, physical education (dance), science, social studies, theatre, and visual arts. The curriculum is student centered, experientially based, exploratory, holistic/integrative, and individualized by diagnostic prescriptive teaching. An introductory section provides goals; long-term objectives; and information on adapting the curriculum by kind and degree of giftedness, minority subpopulation, and delivery system. The curriculum covers six units: self, plants, animals, measurement, space, and computers. For each unit, the curriculum contains background information, a chart depicting visual organization of the topics, short-term objectives, field trip ideas, speaker ideas, bulletin board ideas, snack suggestions, play group ideas, parent letter, colleague letter, pretest, exploratory activities, guided activities, free and inexpensive teaching resources, clip art, questions and topics for independent study, closure activities, unit evaluation, a vocabulary list, and a bibliography. (JDD)

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Region VII Education Service Center
Curriculum Project

Six Units for Primary (K-2)
Gifted/Talented Students

Self (Psychology)
Plants (Botany)
Animals (Zoology)
Measurement (Mathematics)
Space (Astronomy)
Computers (Technology)

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Summer 1988

EC 300 431

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PREFACE

Learning is like a dance performed by a teacher and her students. The teacher leads for the most part, guiding the steps of her partners.

A curriculum is like the choreography for this dance. It tells the dancers where on stage to dance and when, what steps to perform, and when and where to exit. Similarly, the curriculum prescribes the learning activities, their sequence and outcome.

For too long learning has been choreographed by textbook companies. The dance has been more like a march with every student, regardless of exceptionality, in lockstep formation. For less able students, the curriculum surely must feel like a forced march; for gifted students the march is done in place, marking time.

Now, fortunately, the special education movement and other trends in public schools have combined to make the teacher a choreographer again, and the art of teaching has reappeared.

Recognizing the differing abilities of the dancers, teachers have now begun to perform a whole program of dances with their students. The repertory of the schools now includes dances of many difficulty levels and many styles. With a more versatile and flexible curriculum, schools can train cloggers and Broadway dancers, square dancers and prima ballerinas.

Now, as choreographers, teachers can match the dance steps to the abilities of their dancers. They can help children develop their own dance styles, and most importantly, they can teach students to choreograph dances for themselves.

This curriculum is written as an alternative to the textbook march step. It is a catalog of steps (from flap ball change to pirouettes) for teachers to choose from. It is intended to make the teacher's transition from drill sergeant to choreographer easier. It is an invitation to the dance.

Curriculum Overview

- Description of the Curriculum
- Goals
- Long Term Objectives
- Units in the Three-Year Curriculum
- Topics in the First Year's Units
- Contents of Each Unit
- Adaptations of the Curriculum
    - By Kind of Gift
    - By Degree of Gift
    - By Minority Subpopulation
    - By Delivery System
- Getting Ready to Teach A Unit
- Considering the Child

Description of the Curriculum

Length:	Three Years (K-2)
Domains:	Cognitive, Affective and Psychomotor
Content Areas:	Language Arts Mathematics Music Physical Education (Dance) Science Social Studies Theatre Visual Arts
Differentiation:	Two units were originally written for intellectually gifted and creatively gifted students ages three to five; three units were originally written for ages three to six; one unit was written for ages six and seven. All have been adapted to K-2 levels.
Field Test:	The "Self" and "Animal" units were tested on thirty-five children attending two summer preschools (for developmentally advanced children) at Northwestern State University in Natchitoches, LA, in 1983 and 1984. The remaining units were tested on ten children attending a full year preschool/primary program for gifted children in the 1984-1985 school year. (Alpha Project was sponsored by Warren Easton University Lab School, Natchitoches Parish Schools and the NSU Department of Special Education).
Classroom Organization and Pedagogical Style:	Student-centered, experientially-based, exploratory, holistic/integrative, individualized by diagnostic prescriptive teaching.

GOALS

1. The student will exhibit the characteristics of an independent learner and problem-solver.

2. The student will exhibit proficiency in creative thinking and/or in creative production.

3. The student will demonstrate a broad base of knowledge both in the arts and sciences.

4. The student will show continuing development of affective skills.

5. The student will demonstrate proficiency in higher level thinking skills.

6. The student will exhibit satisfactory progress in physical and psychomotor areas of development.

Long Term Objectives

1. The student will regularly engage in autonomous activities including independent research.
2. The student will explain the steps in problem-solving and apply them to everyday situations.
3. The student will regularly engage in creative activities.
4. The student will exhibit attitudes and behaviors necessary to creative thinking and divergent production.
5. The student will participate in 80% of classroom activities which teach content in the arts and sciences.
6. The student will perform at the 90th percentile or above on standardized tests given in the core subjects (language arts and mathematics.)
7. The student will score at least 85% on a teacher-made test of cognitive material covered in science, social studies and health.
8. The student will demonstrate computer literacy appropriate for his grade level or beyond and an understanding of computer operation adequate to or surpassing his current intellectual needs.
9. The student will demonstrate proficiency in higher level thinking skills.
10. The student will develop and maintain a healthy and realistic self-concept.
11. The student will acquire appropriate and effective interpersonal skills.
12. The student will exhibit positive attitudes toward school and learning.

13. The student will demonstrate task commitment.

14. The student will increase exploratory behavior, curiosity and risk-taking.

15. The student will implement critical thinking skills effectively and appropriately.

16. The student will utilize evaluative thinking skills in the classroom and in real-life situations.

17. The student will score satisfactorily (50th percentile or above) on a standardized psychomotor test or a physical fitness checklist appropriate for his age.

18. The student will exhibit a positive attitude toward his physical self including maintenance of healthy habits and regular fitness routine.

Units in the Three-Year Curriculum

Year 1	Year 2	Year 3
Self	Learning	Human Body
Plants	Safety/Health	Matter
Forests	Weather	Energy
Animals	Water	Cycles
Measurement	Sound	Rocks and Soil
Space	Electricity	Machines
Dinosaurs	Food	Chemistry
Computers	Light & Color	Archaeology
Research	Research	Research

Topics in the First Year's Units

Unit	Topics
Self	Physical Self Emotions Five Senses Individual Differences Growth and Development
Plants	Fruits and Vegetables Parts of a Plant Types of Plants What Plants Need to Grow How Plants Reproduce How Humans Use Plants
Forests	Types of Trees Identification by Leaves Seasonal Changes in Trees Forest Habitat Animals of the Forest Forest Fires Pollution-Ecology
Animals	Classifying Animals What Animals Need to Grow Animal Habits How Animals Reproduce How Humans Use Animal Products Care of Pets
Measurement	Weight/Mass Temperature Linear Measure Area/Perimeter Volume

Space	Outer Space (Astronomy) Moving through Space (Dance) Spatial Perception (Visual Arts) How Space is Designed (Architecture)
Dinosaurs	Types of Dinosaurs Habitat and Diet Reproduction and Growth Extinction
Computers	Computers and Society Hardware and Software Languages and Programming Uses in Education
Research	Choosing a Problem Background Reading Writing a Hypothesis Designing an Experiment Collecting and Analyzing Data Sharing Results

Contents of Each Unit

Background Information
Visual Organization of Topics
Short Term Objectives
Field Trip Ideas
Speaker Ideas
Bulletin Board Ideas
Snack Suggestions
Play Group Ideas
Parent Letter
Colleague Letter
Pre-Test
Exploratory Activities
Guided Activities
Free and Inexpensive Teaching Resources
Clip Art
Questions and Topics for Independent Study
Closure Activities
Unit Evaluation
Vocabulary List
Bibliography

Adaptations of this Curriculum*

For Degrees of Giftedness

The extent to which the curriculum must be changed depends directly on the degree of the exceptionality (or exceptionalities) of the child. Simply stated, the more gifted the child is, the more curricular differentiation he will require.

In general terms, then, the more exceptional the child, the more activities from this curriculum he will participate in and the longer time he will need to spend in the gifted program each day. The following statements generally will guide the teacher in the extent of program modifications.

The child who deviates most from the norm, requires the most differentiation. (Examples: IQ 160 students require greater modifications than those with IQ 140; musical prodigies require more curricular changes than students with above average talent.)

The child with multiple gifts requires a more differentiated curriculum than a student with a single gift. (High IQ/High creative students need more changes than just high creatives.)

The child with both positive and negative exceptionalities (examples: gifted-learning disabled, blind-gifted) requires greater changes than a "normal gifted" student.

The child whose achievement exceeds the level of school instruction requires greater alteration of instructional content than a student whose talent area is outside of the traditional school offerings (example: early readers versus early leaders.)

Therefore in using this curriculum the teacher must consider the number of content areas to be modified, the degree to which they must be modified (enrichment vs. acceleration) and the proper kind of modification (content, process, product, learning environment).

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*This section is a summary of June Maker's recommendations in her book Curriculum Development for the Gifted (Rockville, M.D.: Aspen, 1982). For a more detailed discussion, the reader should consult her chapter "Adapting Curriculum for Special Populations".

For Kinds of Giftedness

Students with intellectual gifts and specific academic aptitudes require different curriculum alterations than children with creative gifts or specific talents. In either case, however, the main thrust of the program should be to enhance the student's strengths. Therefore, development of the abilities of high IQ students would include activities which emphasize higher level thinking skills, independent learning and grouping with similarly gifted peers. Students with specific academic aptitudes will profit most from acceleration and enrichment in these content areas.

Students with creative gifts need curricular modifications which support their divergency and enhance the positive characteristics associated with these gifts (Example: sense of humor). Development of creative thinking skills should be stressed along with creative problem-solving skills. Students with specific talent areas need advanced instruction in the areas in which they exhibit special abilities. (Examples: visual arts, music, etc.)

A secondary emphasis for programs should include the remediation of weaknesses usually associated with these exceptionalities. High IQ children may need help in social adjustment and the improvement of creative skills. Creative children may also need help with social skills but particularly need emphasis in convergent skills. A tertiary emphasis might be counseling to provide emotional support for children with adjustment problems.

For Sub-Populations

Research on minority groups (Blacks, Mexican-Americans and Native Americans) indicate population patterns of intellectual and creative abilities However, it is not clear whether these differences are related to socio-economic, ethnic or cultural factors. While teachers must take caution not to over-generalize these characteristics, certain curricular modifications should be made to enhance strengths and remediate areas of weakness when they are confirmed. Generally, culturally different students will need social and emotional support (to overcome prejudice, to maintain motivation, to find appropriate role models, and to understand majority social or education expectations when significantly different from their own). Specific adaptations of the curriculum based of June Maker's review of pertinent research are listed below.

Source: Maker, C. June. (1982). Curriculum Development for the Gifted. Rockville, Md.: Aspen Publications.

Part I: Learning Characteristics

		Culturally Different			Handicapped							
	Disadvantaged/Low SES	Mexican-American	Native American	Black	Sensory Handicapped	Learning Disabled	Mobility Impaired	Social/Emtional Problems	Underachievers	High Performance/Low Verbal	Highly Creative/Low IQ	Highly Gifted
1. Has unusually advanced vocabulary for age or grade level; uses terms in a meaningful way; has verbal behavior characterized by "richness" of expression elaboration, and fluency.	●	●	●	●		X		X		●		X
2. Possesses a large storehouse of information about a variety of topics (behond the usual interests of youngsters his age).	●	●	●			●				●	●	X
3. Has quick mastery and recall of factual information.	X		X	X	X	●		X		●	●	X
4. Has rapid insight into cause-effect relationships; tries to discover the how and why of things; asks many provocative questions (as distinct from informational or factual questions); wants to know what makes things (or people) "tick".				●	●	X		●	X	X		X
5. Has a ready grasp of underlying principles and can quickly make valid generalizations about events, people, or things; looks for similarities and differences in events, people, and things.		X	X	●	●	X		●	X			X
6. Is a keen and alert observer; usually "sees more" or "gets more" out of a story, film, etc., than others.	X		X		X	●					X	
7. Reads a great deal on his own; usually prefers adult level books; does not avoid difficult material; may show a preference for biography, autobiography, encyclopedias, and atlases.	●				X	●						X
8. Tries to understand complicated material by separating it into its respective parts; reasons things out for himself; sees logical and common sense answers.				X	●	X				X		X

X Possible strength

● Possible weakness

Source: Maker, C. June. (1982). Curriculum Development for the Gifted. Rockville, Md.: Aspen Publications.

Part II: Motivational Characteristics

		Culturally Different			Handicapped							
	Disadvantaged/Low SES	Mexican-American	Native American	Black	Sensory Handicapped	Learning Disabled	Mobility Impaired	Social/Emitonal Problems	Underachievers	High Performance/Low Verbal	Highly Creative/Low IQ	Highly Gifted
1. Becomes absorbed and truly involved in certain topics or problems; is persistent in seeking task completion. (It is sometimes difficult to get him to move on to another topic.)	●		X	●		●			●			X
2. Is easily bored with routine tasks.						X			X			X
3. Needs little external motivation to follow through in work that initially excited him.	●		X	●		●			●			X
4. Strives toward perfection; is self-critical; is not easily satisfied with his own speed or products.						X	X		X			X
5. Prefers to work independently; requires little direction from teachers.			●			●			●			X
6. Is interested in many "adult" problems such as religion, politics, sex, race - more than usual for age level.				X								X
7. Often is self-assertive (sometimes even aggressive); stubborn in his beliefs.			●					X				X
8. Likes to organize and bring structure to things, people, and stuations.												X
9. Is quite concerned with right and wrong, good and bad; often evaluates and passes judgment on events, people, and things.								●				X

X Possible strength

● Possible weakness

Source: Maker, C. June. (1982). Curriculum Development for the Gifted. Rockville, Md.: Aspen Publications.

		Culturally Different			Handicapped							
	Disadvantaged/Low SES	Mexican-American	Native American	Black	Sensory Handicapped	Learning Disabled	Mobility Impaired	Social/Emtional Problems	Underachievers	High Performance/Low Verbal	Highly Creative/Low IQ	Highly Gifted
Part III: Creativity Characteristics												
1. Displays a great deal of curiosity about many things is constantly asking questions about anything and everthing.	X		X								X	
2. Generates a large number of ideas or solutions to problems and questions; often offers unusual ("way out"), unique, clever responses...	X	X		X							X	
3. Is uninhibited in expressions of opinions; is sometimes radical and spirited in disagreement; is tenacious.											X	
4. Is a high risk taker; is adventurous and speculative.	X	X								●	X	
5. Displays a good deal of intellectual playfulness; fantasizes; imagines ("I wonder what would happen if . . . "); manipulates ideas (i.e., changes, elaborates upon them); is often concerned with adapting, improving, and modifying institutions, objects, and systems.		X									X	
6. Displays a keen sense of humor and sees humor in situations that may not appear to be humorous to others.	X			X							X	
7. Is usually aware of his impulses and more open to the irrational in himself (freer expression of feminine interest for boys, greater than usual amounts of independence of girls); shows emotional sensitivity.											X	
8. Is sensitive to beauty; attends to aesthetic characteristics of things.											X	
9. Nonconforming; accepts disorder, is not interested in details; is individualistic; does not fear being different.											X	
10. Criticizes constructively; is unwilling to accept authoritarian pronouncements without critical examination.			●	X							X	

X Possible strength

● Possible weakness

Source: Maker, C. June. (1982). Curriculum Development for the Gifted. Rockville, Md.: Aspen Publications.

		Culturally Different			Handicapped							
Part IV: Leadership Characteristics	Disadvantaged/Low SES	Mexican-American	Native American	Black	Sensory Handicapped	Learning Disabled	Mobility Impaired	Social/Emtional Problems	Underachievers	High Performance/Low Verbal	Highly Creative/Low IQ	Highly Gifted
1. Carries responsiblity well; can be counted on to do what he has promised and usually does it well.	X	X	X									X
2. Is self-confident with children his own age as well as adults; seems comfortable when asked to show his work to the class.			X	X			●		●		●	
3. Seems to be well liked by his classmates.		X				●			●		●	●
4. Is cooperative with teacher and classmates; tends to avoid bickering and is generally easy to get along with.		X	X						●		●	●
5. Can express himself well and has good verbal facility and is usually well understood.												X
6. Adapts readily to new situations; is flexible in thought and action and does not seem disturbed when the normal routine is changed.	X					●		●				
7. Seems to enjoy being around other people; is sociable and prefers not to be alone.		X	X	X			●		●		●	●
8. Tends to dominate others when they are around; generally directs the activity in which he is involved.			●									
9. Participates in most social activities connected with the school; can be counted on to be there if anyone is.									●			●
10. Excels in athletic activities; is well coordinated and enjoys all sorts of athletic games.	X			X			●					

X Possible strength

● Possible weakness

Disadvantaged/Low Income

Enrichment programs, especially those which provide open-ended activities, should be offered early and often. Creativity (especially its affective and cognitive aspects) should be developed and leadership skills should be enhanced. Content knowledge and intellectual skills should be strengthened.

Blacks. Programs should emphasize strengths in memory (recall), symbolic areas (e.g. arithmetic) or logical reasoning (independent of semantics) and creative processes particularly figural tasks. They should also provide practice in areas of weakness such as vocabulary development and other processes requiring semantic content.

Mexican-Americans. Academic skills (a relative weakness) should be developed in the program through strengths (interpersonal relationships, creativity, memory, figural content, and evaluation). Early and intense emphasis on language experiences will facilitate conceptual development, vocabulary and other language skills critical to school success.

Native Americans. Program activities should emphasize intellectual strengths in the memory/recall and figural areas. Activities should develop semantic abilities (vocabulary and information) and classification skills. Cooperation rather than competition should be emphasized. Activities involving observation, sensitivity and problem-solving skills can be utilized in other than semantic and classification tasks.

Other sub-populations of gifted/creative individuals (the handicapped, the underachievers, also rural gifted and female gifted) also have special needs profiles. Teachers of students with these conditions must be extremely careful to consult experienced teachers and pertinent literature before designing and implementing a program.

For Delivery System.

Clusters. Teacher with cluster groups of gifted students must teach even young gifted students to become autonomous learners. They must rely for the most part on activities from this curriculum which can be done by students without direct assistance. Because of demands on her time from many students, the cluster teacher should choose a)self-starting, self-paced and self-evaluative activities to be done by gifted students individually or 2) group process activities which can be accomplished by the cluster and evaluated by the teacher at a later time. Therefore the cluster teacher may opt for a majority of activities which are exploratory in nature (individual and group) with less frequent guided activities inserted, perhaps as opening and closing lessons for the week or for the unit. Great care should be taken to provide adequate supervision and instruction in this situation. The use of parent aides, tutors or mentors should be explored to maximize contact time for cluster students. Activities offering enrichment and acceleration should be included depending on the needs of the cluster.

Pullout. Teachers with pullout classes and curricular responsibility for certain content areas should choose activities which are highly differentiated from regular classroom offerings and learning experiences which give students the greatest variety Both exploratory and guided activities are appropriate and should be balanced; acceleration and enrichment should be determined by the needs of the group.

Pullout teachers without content responsibility should choose activities which enable students to be independent learners; 2) have follow-up or extension activities to be performed at home or in the regular classroom; and/or 3) give ample stimulation and motivation to the students. Teachers in this kind of pullout program should be especially careful to choose activities which are meaningful, challenging and substantive.

Self-Contained. Teachers who have groups of gifted children in self-contained settings have the greatest freedom in choosing activities from this curriculum because they have the greatest latitude in grouping students, scheduling lessons, and changing the environment. However, because the self-contained class of gifted children will also need to cover basic skills, the teacher will need to add accelerated lessons based on diagnostic/prescriptive principles. Because the teacher of a self contained class will have many degrees and kinds of giftedness represented, a special effort should be made to offer many types of activities so that all types of gifts are equally valued and developed. The balance between enrichment and acceleration will again depend on the needs of the students and may vary considerably within the class.

Getting Ready to Teach A Unit

At least one month before you begin teaching:

1. Talk to regular education teachers about their plans for covering similar units. Arrange for your study to complement theirs, if possible.
2. Read through the entire unit, scribbling ideas as they come to you. Who would enjoy this activity? Which parent could help on this day, etc.?
3. Look at the lists of recommended activities. Decide how to adapt the curriculum for your particular class, considering student strengths, weaknesses, interests and needs. (The form on the following page will guide your choices.)
4. Give yourself plenty of time to collect the materials needed. Ask parent volunteers to help you arrange field trips, resource speakers and other special events.
5. Talk to the children about the unit; let them make suggestions about activities or topics of study before you finalize your plans.
6. Do background reading in the suggested references if you feel a need to review the subject matter.
7. Tell other members of the school staff (counselor, librarian, etc.) about the unit and ask if they will participate.
8. Make a trial calendar. Invite community resources to be involved on open dates.
9. Plan closure activities especially if they will be included on the school calendar or will involve parents or community organizations.
10. Enjoy!

Considering the Child

Name ______________________________

Overall Gift or Talent: ______________________________

____

Strengths: ______________________________

____

Weaknesses: ______________________________

____

Interests: ______________________________

____

Personality: ______________________________

____

Previous Experiences: ______________________________

____

Current Placement: ______________________________

____

Other Learning Opportunities Currently Available: ______________

____

Family Attitudes: ______________________________

____

Demographics: Race, Sex, Ethnic Group, Socio-Economic Status, Age

____

____

____

SELF UNIT

SELF UNIT

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SELF UNIT

Background Information

The study of self is perhaps the most important and the most rewarding of all the units in this curriculum. It will be important because it will establish the tone and atmosphere of the classoom for the year. It will be rewarding because the unit lays the foundation for the year's interpersonal relationships as well. It is placed as the first unit of the curriculum because (a) it is a topic which has real interest for every young child; (b) it serves as a transition from "regular" to "gifted" education and (c) it gives the teacher great flexibility with regard to academic content so that she can get to know the students and their needs.

The content of this unit is the child. To be effective in their year's work, both the teacher and student must learn about themselves and each other. The length of the unit will be determined by the teacher's content emphasis and the children's needs. A sample of how the unit might be organized follows but these topics and divisions are very flexible. Each week of the unit has as its sub-topic a different aspect of self.

The first week explores the uniqueness of the individual, the characteristics which make us different, our strengths and weaknesses and our attitudes about ourselves. This week is not complete without a discussion of giftedness; other exceptionalities can also be addressed.

The second week features activities about the physical self, senses, health, etc. Many activities traditionally included in the elementary science curriculum can be included here but care should be taken to differentiate them when they are used. This week is a good time to emphasize stress-reducing activities and relaxation exercises.

The third week deals with the emotional self, an area which affords much opportunity to talk about expectations, perfectionism, frustration, sensitivity and positivism. The wise teacher will take at least part of the week to talk about and gain the students' trust.

The fourth week explores our many roles (family member, class member, customer, friend, etc.) The activities for this week are designed to begin to ease the students out of their egocentric perspective and facilitate social growth. Change is featured prominently in the last week; making new friends and learning new skills are emphasized.

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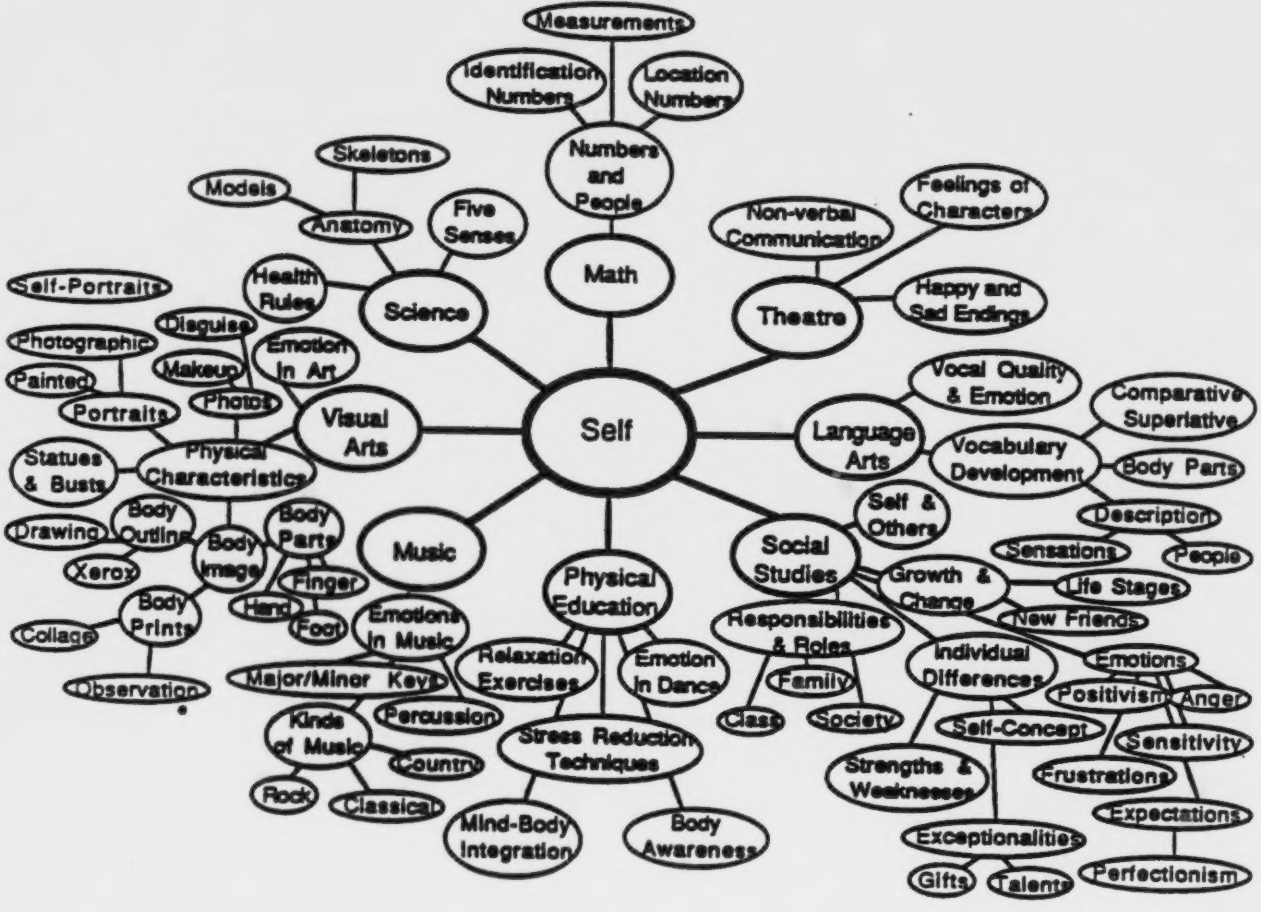
The teacher should vary content and schedule whenever needed to do diagnostic testing, do interviews or counseling, or to observe the children. The content covered is not as important as the first impression it makes on the new student, the environment it creates for learning. Overall, the unit should have, not a cognitive, but an affective emphasis. We do not, for example, care if the student can recite his name, address and telephone number. We do, however, care if the student accepts himself and his exceptionality. The purpose of the unit is to help the children feel good about themselves and their new class. To the extent that the children are comfortable and happy in their new grouping, the teacher has succeeded with this unit.

Visual Organization of Topics


Measurements
Identification Numbers
Location Numbers
Numbers and People
Math
Skeletons
Models
Anatomy
Five Senses
Health Rules
Science
Self-Portraits
Disguise
Photographic
Emotion in Art
Makeup
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Body Image
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Xerox
Finger
Body Prints
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Rock
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Relaxation Exercises
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Feelings of Characters
Theatre
Happy and Sad Endings
Vocal Quality & Emotion
Comparative Superlative
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People
Self & Others
Social Studies
Growth & Change
Life Stages
New Friends
Responsibilities & Roles
Family
Class
Society
Individual Differences
Emotions
Positivism
Anger
Self-Concept
Sensitivity
Strengths & Weaknesses
Frustrations
Expectations
Exceptionalities
Perfectionism
Gifts
Talents

Short Term Objectives

Language Arts

1. The student will correctly use comparative and superlative forms with reference to physical characteristics (e.g. tall, taller, tallest).

2. The student will write or dictate a story or poem about an emotional event.

3. The student will increase his vocabulary by 25 descriptive words.

4. The student will define or give examples of expectations, attitudes, and roles.

5. The student will discuss or give examples of frustration, perfectionism or sensitivity.

Mathematics

1. The student will list various everyday uses for numbers assigned to people (such as identification, location or description.)

2. The student will describe himself using numbers.

Music

1. The student will be able to correctly identify the emotional content of a piece of music.

2. The student will be able to move to music to express an emotion.

3. The student will be able to follow directions in response to song lyrics (e.g. "Put your right foot in.")

Physical Education (Dance)

1. The student will be able to mirror image a partner in gross body position.

2. The student will correctly use labels for body parts (20 different specific nouns).

3. The student will list three stress-reducing activities.

4. The student will participate in at least one relaxation exercise.

Science

1. The student will be able to name the five senses.

2. The student will be able to describe himself or someone else accurately.

3. The student will explain reasons for various health rules or routines.

Social Studies

1. The student will develop a more accurate awareness of self.

2. The student will appreciate his/her own special abilities.

3. The student will give examples of gifts and talents.

4. The student will develop a more realistic self-concept reflecting awareness of strengths and weaknesses.

5. The student will appreciate his/her own uniqueness.

6. The student will list recent physical, emotional or social changes which affect him.

7. The student will define or give an example of stress.

8. The student will list at least 3 skills he would like to learn.

Theatre

1. The student will correctly identify the feelings of characters in a story or puppet show.

2. The student will role play (or in the case of shy students, discuss the role play) several different family or class situations.

Visual Arts

1. The student will include more body parts on his drawings than he previously included.

2. The student will differentiate figures drawn by giving them different body characteristics.

3. The student will be able to relate specific emotions through his artistic products.

4. The student will create at least one self-portrait.

5. The student will identify a portrait, self-portrait, statue or bust correctly.

Field Trip Ideas

1. Visit a dentist; an eye doctor; a hospital. See an ambulance or med-evac helicopter.

2. Visit an anatomy lab to see skeletons and body models.

3. Go to a portrait gallery or see a collection of statues.

4. Visit a photographer's studio to see his portrait work.

5. Visit a percussion lab. Play the percussion instruments if possible. (Emphasize the emotional content of percussions)

Speaker Ideas

1. Invite the principal, coordinator of gifted programs, the school counselor or all three to talk to the students about giftedness. Ask for a definition of giftedness from each.

2. Invite a psychologist (perhaps with DUSO puppets) to talk about making new friends.

3. Invite a person from a local mental health agency to talk on being angry.

4. Ask these people to visit: a mother and a very young baby; twins; an elderly person; a handicapped or disabled person.

5. Invite young musicians to give a concert on the harp (emotion in classical music); the dulcimer (emotion in country music); the synthesizer (emotion in rock music).

6. Invite an artist to demonstrate "gesture drawings", fast sketches that capture the essence of body position during movement.

Bulletin Board Ideas

1. Xerox body parts of various students for display. On Friday, try to assemble a composite child from the various pieces.

2. Take photographs of people's backs for a bulletin board. (Students and staff are fair game.) Have the children identify as many people as they can.

3. Divide your bulletin board into rectangles (total number equals the number of gifted students.) Ask each child to bring pictures, photographs or memorabilia to fill the space. Share several rectangles each day as an introduction to the child, his hobbies, etc.

Snack Suggestions

1. **Favorite foods.** Make a snack calendar for the month. Allow each student to choose his favorite food or drink for one day's snack. Announce the person who chose the snack and let him serve it. Variation: with parent support ask one student to make or bring enough snack for the class on that day.

2. **You Are What You Eat.** At snacktime ask students to share what they have eaten so far that day. Ask what they eat the most. Make pictures or ask the children to draw themselves as their favorite food. (Example: If I were a food I'd be lasagne! Variation: each child may choose to draw himself as several favorite foods such as a pizza face, and peanut butter sandwich body with banana feet.)

3. **Share a spare week.** Ask each child to bring enough snack each day for him and a "spare". Encourage sharing between different students each day.

4. **I Thought I Could.** As part of snack time, allow the student (with guidance, of course) to attempt something he has never tried (pouring from a pitcher, using an electric can opener, etc.) Encourage independence in making, serving and cleaning up snacks.

Parent Letter

DATE:____________________

Dear Parents:

I have enjoyed talking with many of you and am looking forward to having your child (or children) in my class this year.

Each month I will be sending home a letter informing you of our plans, inviting your participation and telling of our accomplishments. There will also be a section suggesting ways in which you can help your child learn at home. These ideas are, of course, optional and I send them only because parents have asked how they can extend lessons to everyday, practical situations.

Our first unit will be called "Self: All About Me". It is my way of learning about the children and their interests. It will also give me an opportunity to introduce myself and this class to them. Below are some topics we will cover:

Week 1 -	Individuals, uniqueness, strengths and weaknesses, exceptional children, gifts and talents.
Week 2 -	The physical self, senses, physical characteristics.
Week 3.-	The emotional self, feelings and how to express them, stress and relaxation.
Week 4 -	Growing and changing, relationships, roles, expectations, responsibilities.

Please feel free to call me, write me or come by the school to visit. We welcome parent involvement and support. If I can be of any help, please ask. I look forward to seeing you on Parent's Night, ____(date)____ .

Sincerely,

Activities for Learning at Home

1. Cut up a large photograph of the child into puzzle pieces and let the child re-assemble himself.

2. Assemble a scrapbook of relatives' pictures with appropriate labels for reading practice.

3. Look through an old family album to follow one person's life (perhaps a grandfather or grandmother) from babyhood to old age. Discuss their physical changes.

4. Discuss the people in the family and their role in the family; discuss how everyone contributes to the family.

5. Allow the child to choose a chore that he wishes to do for one week; then let him swap to another.

6. Visit a relative with a special talent or ability and talk about it. Use the trip as a way of introducing the idea of "gifts and talents".

7. Admit that there are things that you, as a parent, cannot do or are not particularly good at. Explain how you cope with your inability or lack of talent in an area.

8. Talk about the feelings of the characters in bedtime books or stories. Explore alternatives with the child. (Example: "Well, what would have happened if Tigger had apologized? Do you think Eeyore would still have been angry?")

9. Label your feelings for your child. For example, "I feel so frustrated just now . . ." Children need to know that their feelings are the same as yours and that it's all right to become upset, etc. They also need to learn to distinguish between the various shades of negative or positive emotions. Your labeling will help them learn the difference between being truly angry with someone or merely being annoyed.

10. Ask the child to label his or her feelings. Smaller children will need to be prompted at first. "Are you feeling cranky?" "Are you feeling tired?" But with practice, a child will be able

to tell you whether he is crabby because he is hungry or whether crabby because he has hurt feelings.

11. Ask children to express themselves emotionally when a squabble erupts. If we expect the children to settle their differences in words rather than with fists, we must allow them to say how they are feeling. (Example: "I'm angry at Tim because he . . . ." And how does Tim feel?) Allowing children to say how they feel will make it easier to negotiate a solution. Making them aware of the feelings involved will also prevent physical expressions of frustration.

12. Share your dreams with the child and ask for dream stories from him. Discussing dreams, especially scary ones, is healthy because it can help the child see that everyone (even a grown-up) is really frightened sometimes.

13. Discuss the feelings of characters on T.V. shows; children sometimes are confused about why a character is behaving a certain way. Talking during the show does get annoying sometimes, but the feelings involved, especially in violent shows, can be confusing and frightening to sensitive children.

Colleague Letter

DATE__________________

Dear Colleague:

Please forgive the form letter, but I hope you will understand when I say I have been very busy preparing for this new class. I wanted you to know that I will be around to meet you as soon as possible and to talk to you about our shared students.

Your cooperation is critical to the success of the _____ program and to the students we serve. I want you to feel included as you will be seeing the gifted/talented students more than I do; so you are the most important member of the team delivering "gifted education".

Each month I will tell you what we are doing so that you can know what goes on when they're away from your room. Also, I will be checking with you frequently to discuss pupil progress and to supply material for use in your classroom if you want it.

Teaching exceptional children (either grouped or mainstreamed) is no easy task as I'm sure you know. I hope we can support each other as the year goes on. If you have any ideas about sharing students or sharing curriculum, please write or come by. Also, please tell me if you see any problems developing.

Attached is a diagram of the topics in our first unit of study. While most of the curriculum is based on science topics and has a strong math-science emphasis, this first unit is very much about the students themselves.

I am looking forward to meeting our students and to having some time to share with you too. Come by any time.

Sincerely,

Play Group Ideas

Note: Name tags are a good idea for the first meeting of a play group.

1. Children can meet somewhere (a park), eat (perhaps a picnic or barbecue) and play (on playground equipment). The first meeting should not be long or stressful; encourage mixing with a group game if the children seem to need it.

2. Let the teacher change roles and be a hostess. Invite the children to your house for a short visit to meet your family and see where you live. (The teaching relationship then easily turns into a friendship or mentorship.) Make ice cream sundaes.

3. Have each child bring an unbreakable toy to share with a new friend. Facilitate grouping until tentative play groups are formed. Show a short VCR tape if children are still awkward. Share popcorn and kool-aid.

PRE-TEST:

Agree or Disagree

__________ 1. I am a unique and special person.

__________ 2. All people are unique and special.

__________ 3. I like me.

__________ 4. My teacher likes me.

__________ 5. I can do many things by myself.

__________ 6. I make many choices everyday.

__________ 7. I am an individual.

__________ 8. There are many good things about me.

__________ 9. There are some things about me I would like to change.

__________ 10. I am a student, a friend, a child, and sometimes a customer.

__________ 11. Sometimes I get upset and angry.

__________ 12. Everyone has responsibilities.

__________ 13. I like to learn new things.

__________ 14. Many people like me.

__________ 15. I am always growing and changing.

Exploratory Activities

Language Arts/Exploratory Activities

1. Ask children to record how they sound when they are happy, sad, excited, etc. (individually or in a group).

2. Supply labels for children's body parts ("Foot" written on a file folder label can be placed on the child's foot, etc.)

3. Help the children make a booklet about the members of their family. Let the child dictate sentences. Example for beginning reader:

   KATE
   Kate is a girl.
   Kate is a baby.
   Kate is Lauren's sister.
   Kate is little.

4. Make sentence strips about the children if you have a Language Master machine. Allow them to make others.
   Examples:
   Mimi is my mother.
   Nick is my friend.
   I know graphics.

5. Make or have the children make signs for their houses.
   Examples:
   This is Brian's room.
   This is Mom & Dad's room.
   Heather sleeps here.

6. Make a "sometimes I feel" book. Ask each child to contribute pictures and stories about being happy or sad, or scared.

7. At storytime each day, feature a book about feelings, and spend time sharing personal stories about those feelings.

8. Ask students to tell, write or tape stories about atypical animals or children. Story titles might include:
   1) The Lion Who Couldn't Roar;
   2) The Monkey Who Could Fly;
   3) John, the Invisible Boy.

   Try to balance positive and negative exceptionalities.

9. Provide papers for student writing about favorite sports or games. (Use pieces of clip art at the top of these pages to suggest topics or titles.) Examples: "Soccer is a kick!"

10. Post a large sheet of paper. Divide it into 2 columns, same and different. Encourage children to write their ideas on how gifted and non-gifted children are alike and different.

Mathematics/Exploratory Activities

1. Make a poster for each child. Let her write numbers on it which "describe" her. (Examples: 2 sisters, 5 toes, 123 Main Street, 742-9876, 7 1/2, etc.)

2. Display a poster (perhaps hung next to an anatomical diagram) listing numbers of parts of the human body. (Examples: number of lungs, ribs, vertebrae, total bones in body, pints of blood, kidneys, etc.)

Music/Exploratory Activities

1. Listen for the moods in instrumental and vocal music. Play selections which are happy, sad, frightening or excited.

2. Play music with directions for body movements, such as "Hokey Pokey" or "Happy and You Know It".

Physical Education (Dance)/Exploratory Activities

1. Play a memory game with body parts drawn on squares.

2. Play a memory game with children's first and last names written on circles.

3. Make interesting shadows. Provide a screen or sheet and a light. Let children experiment with movements and shadows.

Science/Exploratory Activities

1. Computer software - "Facemaker" by Spinnaker.

2. Note: For these center activities label all items.

   Hearing center: a variety of items which make strange sounds.
   Smelling center: items with strong odors. (Smelly stickers work well.)
   Tasting center: unusual foods.
   Touching center: a variety of textures. (Braille items.)
   Seeing center: visual memory games, optical illusions, 3-d glasses, 3-d pictures, holograms etc.

Social Studies/Exploratory Activities

1. Display pictures of people expressing their individuality by wearing "odd" clothes or doing "odd" things. Ask questioning captions beneath some of them.
   "Is it okay to be different?"
   "Is it all right to wear your hair in a different way?"
   "Should everyone dress just the same?"
   "Does he look the same as you do? How might he be the same as you?"

2. Display pictures of exceptional individuals. Vary the kind of gift or talent each week. Label with names and a paragraph about their abilities or accomplishments.

3. Make a chart for children to fill in with the names of people they know. Post it and explain if necessary. (See below). Ask children to write good things about others.

Name	Talent	Gift

Theatre/Exploratory Activities

1. Provide a puppet theatre. Suggest that the children enact a story with a happy ending; a sad ending.

2. Display pictures on the wall or in a notebook of people's faces (even cartoons) registering an emotion. Provide a mirror and encourage face-making.

Visual Arts/Exploratory Activities

1. Encourage each child to produce a self-portrait in any medium.

2. Suggest that one child model for a short time.

3. Make fingerprints, handprints, footprints.

4. Do painting to music which strongly conveys an emotion.

5. Take photographs of children portraying different moods.

6. Take photographs of children in disguise.

7. Trace children's bodies in unusual positions or shapes.

8. Provide various kinds of puppets for experimental play. Examples: marionettes from Mexico, Indonesian cutout shadow puppets of leather, etc.

9. Make a collage of eyes or a collage of mouths. (Use pictures cut from magazines.)

10. Suggest a family portrait in any medium.

11. Provide puzzles involving body parts.

12. Paint the scariest thing, the happiest thing, etc. in your life and share it with the children.

Guided Activities

Language Arts/Guided Activities

1. Write or say riddles about body parts. Example #1: I am thinking of something which is like rope. It can be wavy stringy or curly. It can be coarse or fine. It comes in many colors. Example #2: I am thinking of something that stretches. It can be smooth or rough. It can be sweaty, dirty, wrinkled or chapped.

2. Make an "I like book" (dictated to teacher by young children) with spaces for drawings. (Examples: "I like to see rainbows; I like to smell flowers; I like to eat brownies..." etc.)

3. Share short stories or pictures which the children and identify the emotion. Introduce vocabulary such as frustrated, lonely, embarrassed, etc. for describing the characters in the story or picture.

5. Play relay listening games or games which give auditory memory practice.

6. Brainstorm all the adjectives one might use to describe another person. Example: petite, muscular, flabby, etc.

7. Make a book for the children from construction paper or typing paper. Ask each child to draw a picture of how he feels and to write what made him feel that way. (Example: sad when grandmother and grandfather go home.)

8. Invite a person to demonstrate American Sign Language or learn several signs yourself and teach them to the students. Share ASL dictionaries and allow students to spell their names using the ASL alphabet.

9. Use the book, Gifted Kids Speak Out by Jim DeLisle to get discussions started on being in a gifted class. Each chapter has questions ("Speak for Yourself") which can be used to start or stimulate thinking on being "gifted". Variation: Use the cartoons in this book to make overheads and ask for comments. If your students are reluctant to express themselves, try a journal instead.

Mathematics/Guided Activities

1. Explain that numbers are a means of identifying individuals. Show the class all the numbers which are used to identify you: social security number, driver's license number, employee number, credit card numbers, etc.

2. Talk about numbers that give location - phone-(area code); address-(zip code); building and room numbers.

3. Show other numbers which describe you in some way: age, measurements, years married, number of children, years teaching, etc. With older students distinguish numbers used to measure time, physical characteristics, or mental characteristics.

4. Discuss license plates and their purpose.

Music/Guided Activities

1. Play major and minor scales on any instrument. Play pieces in major and minor keys. Emphasize the feelings conveyed by major and minor compositions.

2. Do some group composing. Let students each contribute a line of lyrics for "The Happiness Song". The song "Happiness Is" from You're a Good Man Charlie Brown can be used for the melody.

Physical Education (Dance)/Guided Activities

1. Use Body Awareness Cards by Trend

2. Do body mirrors. (One child follows another child's lead and assumes the same body position.) Start by asking children to use only one hand; then, progress to two hands, two feet, head and face, entire body frozen; finish with entire body in slow, continuous movement.

3. Sing movement songs involving parts of the body: "Hokey-pokey", "Put your little foot, "If you're happy and you know it". Do variations on each.

4. Clap the rhythm of a child's name. Have the child do three variations of his name dance--mad, sad, glad.

5. Play "Simon Says" with new body parts vocabulary. (Use thigh, calf, etc. for younger children and metatarsal and derriere for older students.)

6. Practice relaxation exercises using tapes or records.

Science/Guided Activities

1. Take pictures of everyone. Make a poster labeling hair color or eye color.

2. Talk about one sense each day. Discuss the sense organ; display models if possible of eyes, ears, etc. Discuss the parts of the brain which do sensory processing.

3. Ask children to guess different smells; identify various sounds; taste various foods. Encourage vocabulary development for exact description.

4. Provide touching activities with various objects and various plants (ivy, cacti, jade, etc.) to practice vocabulary words such as "smooth, sharp, fuzzy, spiny, waxy", etc.

Social Studies/Guided Activities

1. Discuss the role of your school counselor, friends, psychologists, family and clergy in helping students express emotions and cope with problems.

2. Read one chapter of The Gifted Kid's Survival Guide by Galbraith each day (see bibliography). Give students time to discuss their reaction to the chapter.

3. "Boundary breakers" or "magic circle" activities are perfect for the beginning or ending of the class. Encourage self-disclosure and acceptance.

4. **Teach social problem-solving techniques**: Model the technique for a week or two before presenting it. Then show the steps written on a chalkboard.
    - Define the problem (and who is involved.)
    - Brainstorm possible solutions.
    - Think of possible consequences for each of the people involved.
    - Choose the best solution and try it.
    - Evaluate it.

    Use disagreements which occur in class to practice the techniques. Ask students to tell if and how this technique could be used in their other classes or at home.

5. Talk about how adults solve their problems. Discuss disagreements between companies and nations. Try to draw analogies between fist-fighting on the playground and wars; being punished by the teacher and being sent to prison; between competition for business (coupon wars) and competition in a race.

6. **Talk about negotiation and compromise.** Ask for definitions of these terms. Then give students several situations related to school. Ask them to generate compromises. Examine each compromise to see who is giving up more, getting more. Talk about your job as negotiator. Let students practice negotiation between pairs and then apply the skill to real disagreements in your room.

7. Talk about groups to which a child belongs. Make a hierarchy from smallest numbers to largest numbers. For older students discuss purposes of these groups. Tell children about groups to which you belong.

8. Talk about being in large groups of people (a parade) or in a crowd (at a mall) or at an event with lots of spectators (football game). How does it make you feel? Do you like being with many other people? Do you prefer small groups? Are there times when you like both? What are some activities that are more fun if done in a large group? What are some things you like to do with just one friend?

9. Brainstorm the many kinds of relationships that people have (family, school-related, work-related, in organizations, etc.). Discuss which of these are usually "helping" relationships. Extend the lesson by brainstorming ways in which members of your class help others (in any setting). How might we as a class help other classes or other people in our school this year?

10. **Discuss some of these questions:**

    Why do parents know so much?
    Why do adults get to be in charge?
    Why do parents make you do things you don't want to do?
    Why do teachers make you learn all day?
    What would happen if children were put in charge of a school?

11. **Explain learning styles.** Give a learning style inventory. Ask children to decide how they learn best. Relate subjects to learning style (example: music-auditory). Relate talents to learning style (example: painters - good visual memory).

12. Talk about learning and conditions which affect it. Display posters for children's contributions.

    It's hard for me to learn when . . .
    One thing that prevents me from concentrating
        is . . .
    The best teachers . . .
    When I want to learn something new, I . . .

    Discuss the differences between your classroom and "regular class". Ask for suggestions on how the children want to learn. Tell them about upcoming opportunities for independent learning.

13. Ask each older student to list 20 famous people. (For younger students, write a class list.) Why are they famous? (Sports, government, entertainment, etc.) Do you think they're gifted? In what way (physically, leadership, intellectual, etc.)? What are celebrities? What are "stars"? Are they gifted? Do you know any children who are famous?

14. **Define "cooperate" and "compete".** Ask for examples. Can you think of situations which involve both? (Team sports.) Talk about feelings associated with competition and cooperation. Discuss rules for both.

15. Encourage children to label their feelings honestly during the day. "Are you feeling energetic right now?" "Are you angry with him for taking the toy?" "Do you feel proud of yourself?" Label your feelings for them.

16. Display this statement. "Different isn't bad or good. Different is only different." Talk about extremes of height/weight/talent/intelligence. Discuss being different, feeling different, looking different. Talk about "average" height, weight, etc.

Theatre/Guided Activities

1. Do role-playing: Give various situations involving disagreements and act out how they might be resolved.

2. Role-playing: Improvise various situations involving making new friends.

3. Role-playing: Improvise various situations involving babies, siblings, and sharing.

4. Introduce the term "nonverbal communication". Have the children share their cues about the emotional state of parents or teachers.

5. Act out emotions nonverbally. Have each child choose one feeling and portray it. Observers can guess what emotion the actor feels. For more advanced students hand out cards with more subtle emotions (example: disappointment) and again let the audience guess.

6. Encourage miming. Allow each student to choose to mime an activity. A variation of this activity is to repeat the activity in a different emotional state. Examples: getting dressed when sleepy, when angry.

Visual Arts/Guided Activities

1. Make a mobile of faces depicting various emotions.

2. Show self-portraits of great artists. Discuss their lives. Ask the children if they can tell how the artist felt about himself from the picture. Did he have a positive self-concept? Was he critical of himself? Individually discuss whether their own self-portraits are positive or negative.

3. Whose feet? Whose hands? -- Hide a child inside a box or behind a screen and let only his feet (or hands) show. Guess who it is.

4. Paint a picture of yourself doing a movement or show reproductions of art which stress body movement. Example: Degas's ballerinas. Ask children to paint themselves doing something they like to do or do well.

5. Make a class project from a roll of film. Ask the child each to make a face for the feeling you name. Then you can display them all together or make a guessing game of the words that match the emotions. Discuss how people sometimes "misread" facial expressions.

6. Make a different kind of puppet each day. Allow much individual expression. Examples - Cloth puppets, sock puppets, dowel or stick puppets, etc. Comment on representations of the human form (realistic to stylized).

7. Provide a large piece of mural paper. Entitle it "Recess". Ask each child to draw himself on the mural doing something at recess.

8. Discuss the term "talent". Distinguish it from giftedness. Ask the children to name the arts and tell the term for the practitioner of the art. Example: dance - dancer, ballerina, choreographer, etc. Produce a group work of any kind showing children engaged in the arts (visual & performing arts and creative writing, too.) Discuss their favorite arts and their own talents.

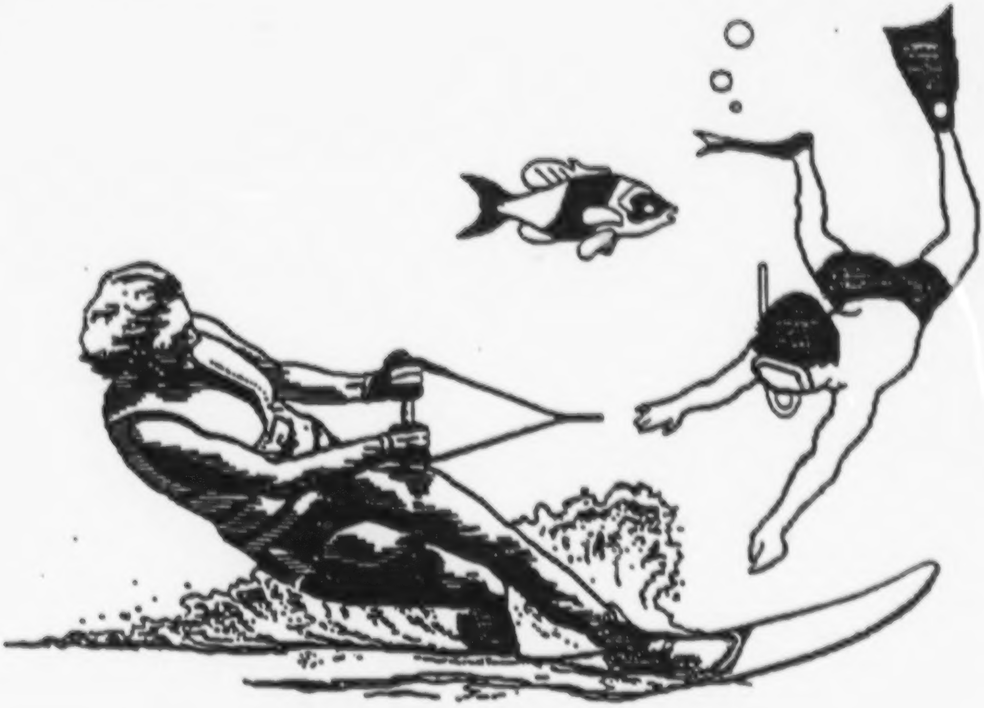
9. Ask children to draw these lines.
    1. a line taking a rest;
    2. a line goes for a walk;
    3. an excited line;
    4. an angry line;
    5. a sleepy line.

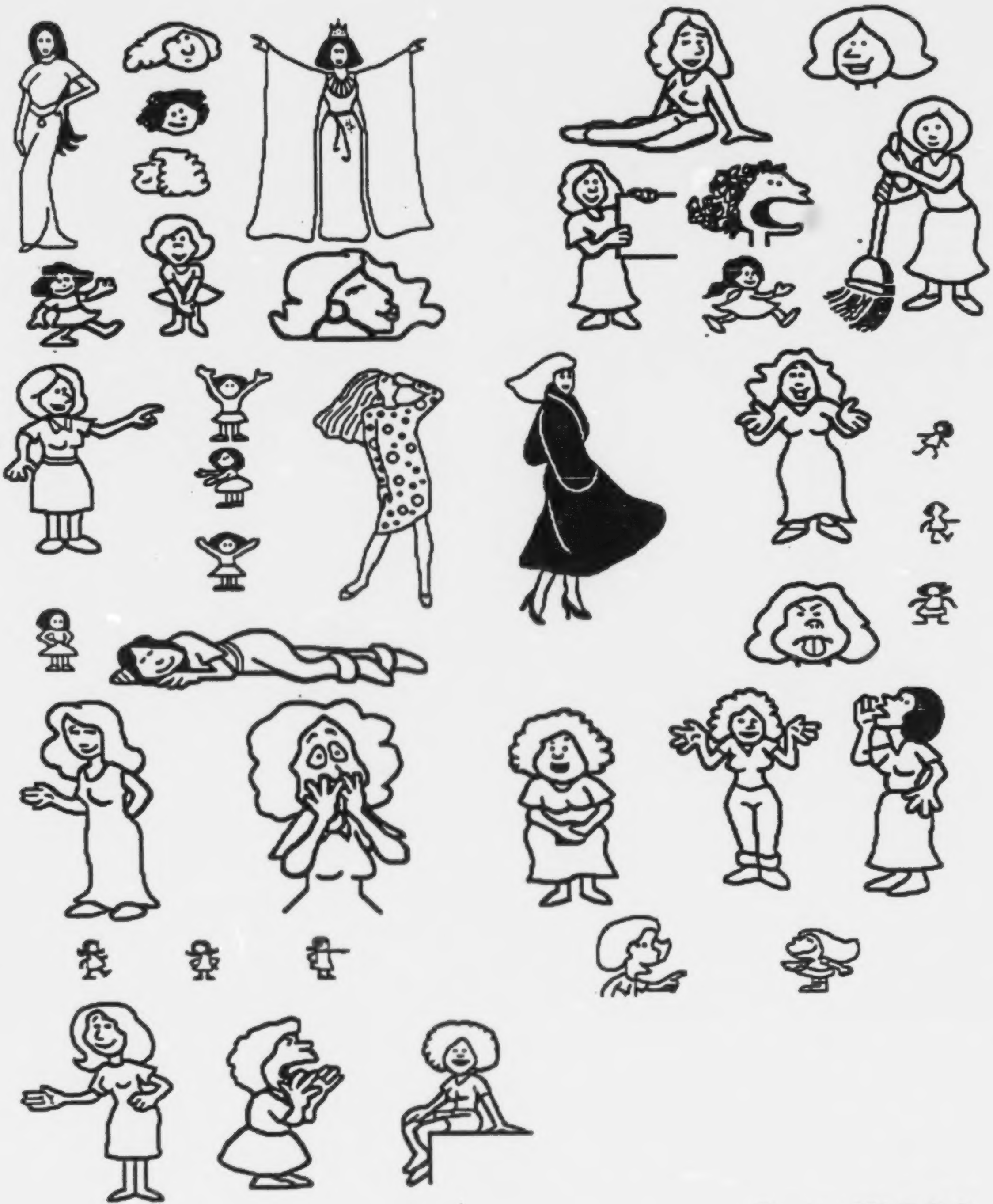
   Expand the activity to two lines. Have children put a pencil in each hand to draw these lines.
    1. Two lines meet and shake hands.
    2. Two lines get into a fight.
    3. Two lines in love.
    4. Two lines take a walk together.
    5. Two lines are afraid and run away.

Free and Inexpensive Teaching Resources

National Association for Gifted Children 4175 Lovell Road, Suite 140 Circle Pines, MN 55014 (612) 784-3475	Pamphlets, Books, reprints, tapes and parent materials.
Council for Exceptional Children The Association for the Gifted 1920 Association Drive Reston, VA 22091-1589	Pamphlets, Books, reprints, tapes and parent materials.
National State Leadership Training Institute on the Gifted and Talented (NSLTI) Civic Center Tower Building Suite PH-C 316 West 2nd Street Los Angeles, CA 90012	Pamphlets, Books, reprints, tapes and parent materials.

Wonder Boy





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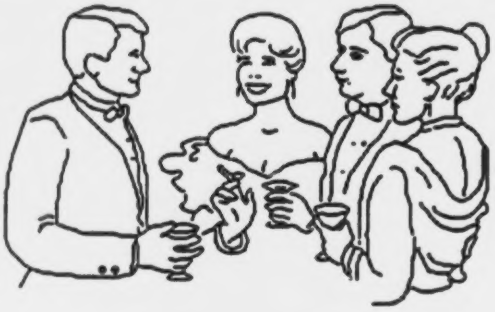

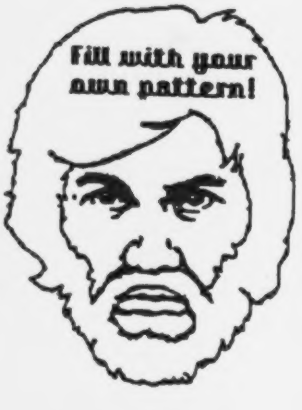
Fill with your own pattern!

Questions and Topics for Independent Study

Note: Independent study is not recommended for this unit. Emphasis should be placed on group activities and on developing group identification and spirit. Individual work should not be encouraged unless the situation is very unusual.

Closure Activities

1. Ask each child to write, dictate or record a autobiography. Supply a list of questions they can use to collect information about themselves from other people.

2. Have an art show (perhaps for parent's night) of self-portraits and family portraits done by the children. Take photographs of the children working in class to share, too.

3. Make a class time line (marked off in months) and mark on it when important life-events occurred for your students. (Let them choose what's important.) This activity will help the students get to know each other's backgrounds better and may lead to the discovery of shared experiences. (Example: We both broke our arms when we were four!)

4. Use this informal evaluation to see how students feel about themselves after the unit. This page is a self-evaluation and should not be graded. Note: It is not appropriate to compare pre-test scores with this "post-test" as they are not alike in content.

Agree or Disagree

_______ 1. I have a special "gift" or ability.

_______ 2. This class will help me learn to use that ability.

_______ 3. I am like other people in many ways.

_______ 4. I am unique too.

_______ 5. This year I will learn many new things about myself.

_______ 6. I am good at many jobs.

_______ 7. There are some things which will be hard for me.

_______ 8. I can be independent in some ways.

_______ 9. Other people depend on me and I depend on people too.

_______ 10. I like to grow and change.

_______ 11. Everyone has emotions and needs to express them.

_______ 12. Other people have expectations of me.

_______ 13. I can accept or reject others' expectations.

_______ 14. It's good to try your best.

_______ 15. I don't always have to be perfect.

Unit Evaluation

Evaluation of the student's progress may include but not be limited to:

1. Achievement of short term objectives regarding participation and products.
2. Completion of culminating product or performance (individual or group) requiring synthesis of major concepts taught.
3. Difference in the number of body parts or detail included on drawings of self before and after the unit.
4. Successful interview of student about his attitudes and feelings about being in the class.
5. Observations or notations showing student growth in self-acceptance, self-disclosure, improvement in interpersonal relationships or development of social skills.

Vocabulary

- adopted
- ambulance
- anatomy
- anger
- angry
- arch
- attitude
- attribute
- aunt
- awareness
- baby
- body
- brain
- brother
- brother-in-law
- buttocks
- calf
- change
- character
- characteristic
- chest
- citizen
- classical music
- collage
- communication
- comparative
- compare
- compromise
- concept
- cope
- coping
- country music
- cousin
- crowd
- curriculum
- customer
- cuticle
- deaf
- describe
- description
- difference
- different
- disagreement
- disappointed
- disguise
- divorced
- elderly
- emotion
- emotional
- exceptional
- excited
- expect
- expectations
- express
- family
- father
- favorite
- feel
- feeling
- forearm
- forehead
- fraction
- friend
- frustrations
- gifted
- grandfather
- grandmother
- great-grandfather
- great-grandmother
- group
- grow
- growth
- gums
- handicapped
- happy
- hate
- health
- hear
- hearing
- hips
- hungry
- husband
- identification
- imagery
- independent
- individual
- integration
- jealous
- knowledge
- like
- limb
- listen
- location
- lonely
- look
- love
- major key
- married
- measurement
- mental
- mind
- minor key
- mother
- mother-in-law
- mute
- need
- negotiate
- neighbor
- nervous
- non-verbal
- nostril
- outline
- palm
- paralyzed
- part
- percussion
- perfectionist
- perfect

pet
photograph
physical
portrait
positive
print
pupil
relate
related
relationship
relatives
relax
relaxation
responsibility
rib cage
rock music
role
sad
same
scalp
see
self
self-awareness
self-concept
self-portrait
sensation
senses
sensitive
sensitivity
sex
shin
sibling
sight
single
sister
sister-in-law
skill
sleepy
smell
smelling
spine
statue
strength
stress
student
superlative
talented
taste
tasting
teacher
tension
thigh
thirsty
torso
touch
trust
twins
uncle
unique
value
verbal
vision
want
weakness
whole
wife

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Independent Research

No research is recommended for this first unit.

PLANT UNIT

PLANT UNIT

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PLANT UNIT

Background Information

Note: The plant unit was planned for and tested in October but is easily adapted for spring.

The study of plants, in both an accelerated and enriched way, is a valuable component of a curriculum for bright, primary children. However, while the subject matter for this unit is plants, the goals of this unit are much broader than the mere factual information about the plant kingdom.

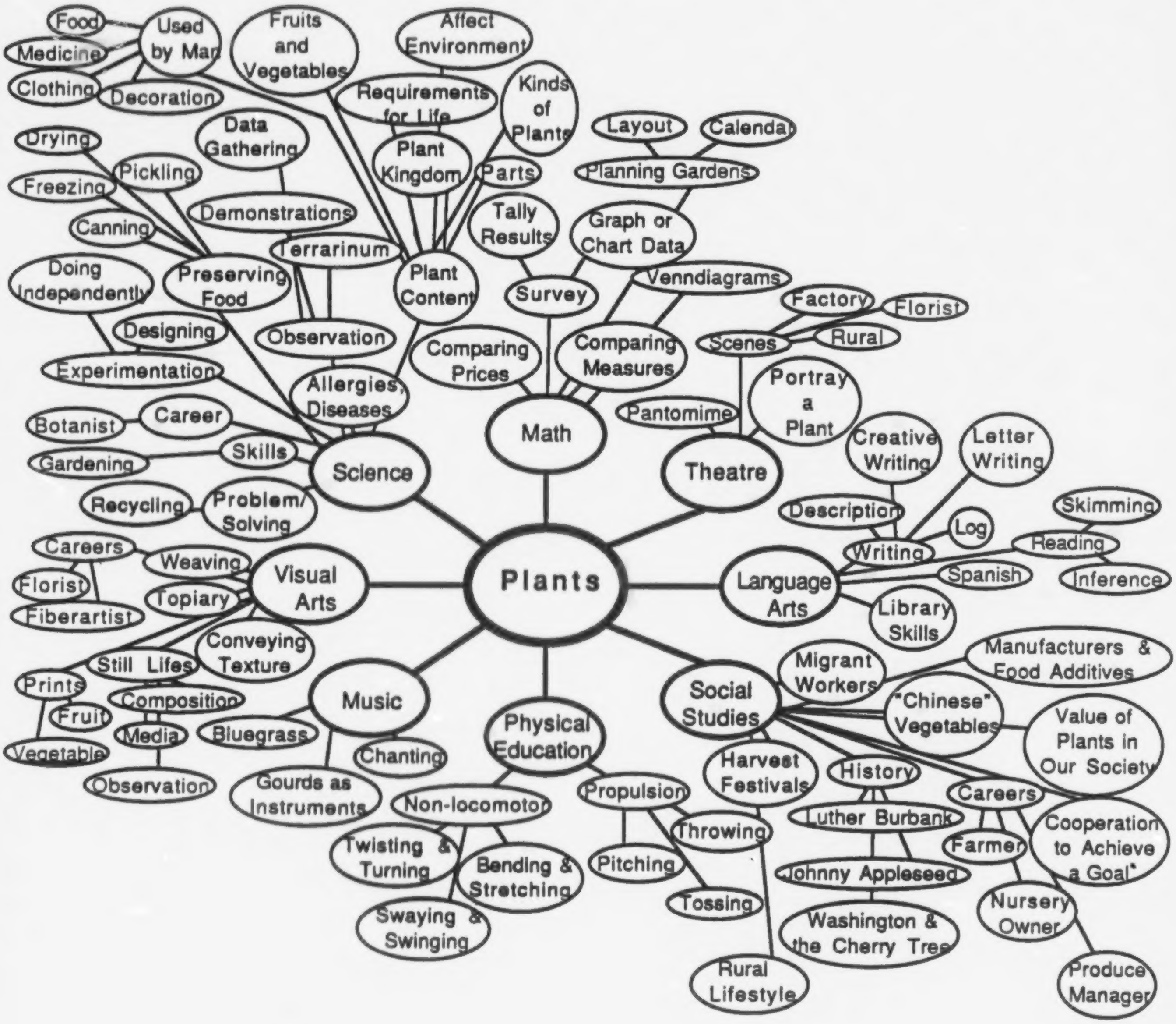
Reading through the short term goals, one finds many skills, concepts and attitudes being addressed. A primary emphasis is experimentation, a secondary emphasis cooperation, a tertiary one, vocabulary development, especially description.

The concrete, hands-on experiences so vital to permanent and meaningful storage of knowledge is essential to all these planned activities; by participating in these experiences children are able to (and motivated to) communicate these happings in their lives through the visual arts, music, literature and theatre. The teacher is encouraged in this unit to draw connections for the children between . . .

1 - the "real world" (of farming and gardening) and "school experiences (lessons on plants)
2 - the subject matter (science) and the children's experiences (of natural plant phenomena)
3 - the products of artists and their need to communicate their experiences (with plants) to their audience
4.- the designing and performing of experiments and the scientist's "need to know"
5 - the skills of cooperation and the accomplishment of goals
6 - the size and complexity of words and the need to share complete and accurate descriptions of events or objects.

In short, as you provide experience for the children, relate the why of the activity and the how of learning to needs children have in their lives. "Plants" must not be one more month of filled lesson plan boxes but an opportunity to share experiences and ideas about plants.

Visual Organization of Topics


Plants
Science
Math
Theatre
Language Arts
Social Studies
Physical Education
Music
Visual Arts
Food
Medicine
Clothing
Used by Man
Decoration
Fruits and Vegetables
Affect Environment
Requirements for Life
Kinds of Plants
Plant Kingdom
Parts
Data Gathering
Drying
Pickling
Freezing
Canning
Demonstrations
Terrarinum
Plant Content
Doing Independently
Preserving Food
Observation
Designing
Experimentation
Allergies, Diseases
Botanist
Career
Gardening
Skills
Recycling
Problem/ Solving
Layout
Calendar
Planning Gardens
Tally Results
Graph or Chart Data
Survey
Venndiagrams
Comparing Prices
Comparing Measures
Factory
Florist
Rural
Scenes
Portray a Plant
Pantomime
Creative Writing
Letter Writing
Description
Log
Skimming
Writing
Reading
Spanish
Inference
Library Skills
Careers
Weaving
Florist
Topiary
Fiberartist
Conveying Texture
Still Lifes
Prints
Composition
Fruit
Media
Vegetable
Observation
Bluegrass
Gourds as Instruments
Chanting
Non-locomotor
Twisting & Turning
Bending & Stretching
Swaying & Swinging
Propulsion
Throwing
Pitching
Tossing
Migrant Workers
Manufacturers & Food Additives
"Chinese" Vegetables
Value of Plants in Our Society
Harvest Festivals
History
Careers
Luther Burbank
Farmer
Cooperation to Achieve a Goal
Johnny Appleseed
Nursery Owner
Washington & the Cherry Tree
Rural Lifestyle
Produce Manager

Short Term Objectives

Language Arts

1. The student will write a letter requesting a catalog, seeds or plants; or he will keep a log of what he observes in experiments.
2. The student will skim several kinds of printed materials or read one book about plants.
3. The student will increase his reading and/or speaking vocabulary by 50 words.
4. The student will improve inference skills in reading or listening to several passages.
5. The student will read or tell jokes and riddles.
6. The student will explain various places within a library where information on plants can be found.
7. The student will recognize Spanish when spoken and learn at least 10 Spanish words.
8. The student will listen attentively to guest speakers and classmates 80% of the time.
9. The student will participate in at least 2 discussions effectively.

Mathematics

1. The student will conduct a survey and tally results; the student will communicate those results informally to an audience.
2. The student will collect data and organize it into some visual product (a graph or chart).

Music

1. The student will participate in chanting activities 80% of the time.

2. The student will sing in class 80% of the time.

3. The student will distinguish between bluegrass and other forms of music.

4. The student will demonstrate musical creativity by: writing a song or chant about plants.

5. The student will explore freely the makeshift instruments (gourds) or real instruments (with reeds) provided.

Physical Education (Dance)

1. The student will correctly perform the basic propulsion activities (such as tossing, pitching and throwing).

2. The student will participate in group activities 80% of the time.

3. The student will improve coordination and flexibility by practicing non-locomotor movements such as twisting, turning, bending, stretching, swaying and swinging.

Science

1. The student will define "experiment".

2. The student will tell the purpose of experimentation.

3. The student will design and conduct at least one experiment.

4. The student will observe classroom demonstrations 80% of the time.

5. The student will explore provided materials thoughtfully and thoroughly.
6. The student will demonstrate problem-solving behaviors during experiments.

7. The student will observe carefully the natural objects supplied or those in his environment.

8. The student will plant at least one seed and pot at least one plant successfully.

9. The student will detail many ways of learning about plants.

10. The student will name and identify the parts of a plant.

11. The student will tell the difference between a fruit and a vegetable.

12. The student will explain the requirements for plant life.

13. The student will use the following terms correctly: bushes or shrubs, trees, potted plants, seeds, leaves, buds, roots, stem or stalk.

14. The student will name at least 5 kinds of plants (cactus, fern, moss, algae, mushroom, etc.).

15. The student will use the words in the general vocabulary list correctly 80% of the time.

16. The student will use provided materials and instructions to accomplish scientific activities independently.

17. The student will tell the difference between the plant, animal and mineral kingdoms and give an example of each.

18. The student will define "data" and give an example.

19. The student will explain (or show using drawings) the meaning of sprouting or germinating; decomposing or rotting; or pollinating.

20. The student will list ways in which plants are used by man.

21. The student will list ways in which plants affect the environment.

Social Studies

1. The student will cooperate in the planning and execution of the class garden project.

2. The student will explain the value of plants in our environment.

3. The student will compare and contrast rural and urban lifestyles.

4. The student will describe or draw scenes of problems discussed with regard to America's farmers or migrant workers.

Theatre

1. The student will portray at least one plant in a skit, pantomime or improvisation.

2. The student will do non-locomotor movements expressively on a plant theme.

Visual Arts

1. The student will produce at least one still life (any medium) and one series of prints (fruit or vegetable).

2. The student will construct a 3-d product (scarecrow or pumpkin).

3. The student will participate 80% of the time in classroom sensory experiences which require detailed observations.

4. The student will correctly identify a still life.

5. The student will be able to differentiate between printing and painting.

6. The student will use 70% of the following new words correctly in an artistic context: outline, texture, shape, form, line, composition, print, design.

7. The student will explain what a florist's job is.

8. The student will explore various media for depicting still life.

9. The student will demonstrate visual and tactile discrimination in drawing flowers & plants.

10. The student will relate a design produced by printing to the three dimensional object that made it.

11. The student will participate in group discussions about artists or works of art 80% of the time.

Field Trip Ideas

1. Visit a cotton field, cotton gin or cotton seed oil company. The ideal field trip would include all three and a discussion of what happens to the cotton plant at each location.

2. Visit a hay field. Let the children climb hay bales, chew on hay, play hide and seek, etc. Talk about the importance of "just dried grass" to livestock.

3. Visit a nature preserve, arboretum or botanical garden. Talk with several people who work there about why this place exists, who pays for its operation, what plans have been made for the future, what kinds of jobs exist there.

4. For younger children, visit a store or produce market. Look at all the various kinds of vegetables and fruits for sale. Read the signs (name and price) and weigh the produce. Buy fruit for the seed-finding activity, snacks, vegetables for vegetable prints, ingredients for salad, or unusual items (like mangoes or kiwi) that they want to taste.

5. Visit a nursery. Observe the kinds of plants (ferns, annuals, shrubs, trees) and specific types of each. Note prices. Buy small plants for terrariums, potting practice, or the class project.

6. Visit a florist. Talk about flower arranging as a profession, why people buy flowers, when her shop is busiest, what else she has to do besides arrange flowers. Ask her to demonstrate some of the rules of flower arranging. Buy flowers to bring back to the classroom for other activities.

7. Visit a farm and talk to the farmer about what he grows, in what order, what fertilizer he uses, whether he has irrigation, who picks his crop, etc.

Speaker Ideas

1. Ask a fiber artist to visit and to show fabric she has woven or dyed; if batik is one of her preferred techniques, perhaps she could demonstrate it. Discuss working with cotton and various other fibers. (sisal, hemp, wool, silk).

2. Ask a botanist to talk about and demonstrate grafting, pruning and taking cuttings from plants.

3. Invite an amateur gardener to demonstrate how to pot a plant correctly. Be sure she gives the reasons for the various steps she takes. Allow the students to ask questions about the procedure. (Emphasize the purpose of the gravel, the potting soil, the need to leave room to grow, the damaging effect of air around the roots, etc.) Then let the children each pot a plant, perhaps to decorate the room or to be given to a nursing home patient.

4. Invite a produce manager from one of the local groceries or supermarkets to talk about his work. Where does the produce come from? How does it get to his store: What does he do to it to get it ready for the customers? What becomes of the leftover produce? What is the best part of his job?

5. Invite a gardener (perhaps an older person) to plant a small patch near your classroom window. Ask him to explain the steps and why he does each (e.g. building hills, using strings, labeling each row). Have him visit to check on the progress and to supervise children in weeding, hoeing, etc.

Bulletin Board Ideas

"Grapes Aren't Always Green and Apples Aren't Always Red"

Use magazine advertisements, gardening photos or still life paintings to illustrate that various colors of apples (yellow, green and red) and grapes (red, blue-purple and green) are very possible. If your budget allows, buy some of these fruits and have the children mix paint to the right shade for the fruit. Note: this is a good time to show the children Picasso's blue apples!

"FRUTA=FRUIT"

Use a standard "fruit" bulletin board to teach English and Spanish equivalents. Ask a Spanish-speaking student or teacher to pronounce the words correctly on Monday. Practice with plastic fruit all week and invite her back on Friday to test the class on their pronunciation. Examples:

apple = manzana, pera = pear, naranja = orange,
pina = pineapple, banana = banana, grapes=uvas

"Parts is Parts"

Buy packaged bulletin board materials (appropriate for upper elementary or junior high students) and put them up. The diagrams should emphasize the parts of plants, flowers and seeds. On Friday, take down all the labels and see if the students can put them back up in the right places.

"Leaves Aren't Always Green"

Display pictures of crotons, coleus, poinsettia and fall foliage. Label them appropriately. For more advanced students discuss the plant pigments, chlorophyll, xanthine, etc.

Snack Suggestions

1. Provide cucumbers and various kinds of pickles (sweet, dill, bread-and-butter, etc.) Talk about pickling. If your group enjoys pickles, bring other pickled items for them to try (even pickled eggs!) or invite a person to talk about pickling and why it is done.

2. Have a taste-testing of juices and, for fun, blindfold the children and have them identify the fruit (or vegetable) they're drinking. Fruit juices are easy (include lemonade and limeade);

for older groups try carrot juice or V-8. For discriminating palates, give combinations like cran-grape and then ask them to choose from a multiple choice answer (cran-apple or cran-grape, etc.) An extension is to do taste tests which ask students to discriminate between orange juice with or without pineapple juice added; with or without banana added; with or without calcium added.

3. Prepare Chinese vegetables in a wok (stir-fry in any light oil). Discuss water chestnuts, bamboo sprouts, and other Chinese vegetable favorites.

4. Have watermelon if it's in season. Have a watermelon seed-spitting contest for the p.e. activity if you can stand it.

5. Bob for apples in P.E. Eat the apples for snack. Talk about the seeds and save them to plant later.

6. Serve canned fruit. Contrast the texture and color and taste with the fresh fruit usually eaten. Why do people can fruit? dry it? How else can you preserve it? What kind of peaches, for example, do you like best--fresh, frozen, dried, or canned?

7. Grapes and raisins, plums and prunes. (Obviously about dried fruits.) Follow up the next day with commercially prepared mixtures of dried fruits or make your own. Extend the lesson by "dissecting" trail mix. What makes up trail mix?

8. Popcorn (Show an ear of corn, the kernels and the finished product). Share the book about popcorn as they eat. (See bibliography)

9. Sample foods with spices such as garlic, pepper, mustard, etc. Have the children smell others such as cinnamon, cloves, etc. Display other plants used for cooking and garnishing such as parsley, bayleaf, etc.

10. Serve various kinds of bread and butter (or jam). Discuss various grains (wheat, rye, barley). Show pictures of grain fields and/or grain silos or processing plants.

11. During the week of Halloween serve variations on the pumpkin. Cooked pumpkin, toasted pumpkin seeds, pumpkin bread and pumpkin pie can be offered.

12. Sunflower seeds; peanuts, almonds and cashews; pistachio nuts. Talk about the difference between seeds and nuts.

13. A coconut! Tell children that they must figure out how to open it before they can eat it; hide the hammer.

14. Offer herbal tea, rosehips or camomile. Talk about medicinal herbs and teas.

PARENT LETTER

DATE____________________

Dear Parent,

The plant unit will really keep us busy this month! In addition to covering the factual information (parts of a plant, plants we use, what plants need to grow), we will be doing a series of experiments as well. These activities will be the children's introduction to the scientific method and will provide them with many practical experiences about gardening too. But this science emphasis is only part of our study. The students will be painting plants, writing about plants, singing about plants and doing math and physical education activities related to plants as well.

While I do the classroom activities set, you can help with the out-of-school learning. First, do you know of interesting field trips or people from our community who could be guest speakers? Any career or place related to plants might be included. If you do, please take the time to send a note or phone me. I would really appreciate the opportunity to involve our community.

Second, please take time this month (maybe on Saturdays) to teach your child about plants, too. Here are four ideas for family activities that you might consider.

Take your child to a greenhouse or nursery to look at plants.
Plant something new with your child -- either in your yard or a house plant.
Buy seeds and start a small window box garden or herb garden.
Take your child to a library or bookstore to get a book about a plant that interests him.

Your cooperation and active involvement are so important to his development and to the success of our program. Please feel free to come visit for any of our activities. The school is still accepting names of parent volunteers and I could surely use an hour of help each week. If you have any questions or ideas, please call. Thank you.

Sincerely,

COLLEAGUE LETTER

DATE____________________

Dear Colleague,

You may have heard that we will be studying plants next. Yes, in a way. But really the plant material in the unit is just a vehicle for several other goals. I want to teach our students this month about . . .

1 - Doing an experiment: what it is, how to do it, why to do it.
2 - Cooperating on a group project: why we all need to help, managing our time and resources; solving problems to get the job done.
3 - Valuing plants: why plants are important to our environment, to our body, and to our society.

You may have teaching materials on plants or on these other objectives which would be helpful to me. Also there may be things you don't want me to use. Please feel free to say so. Also please tell me if you will have time for any joint activities this month. I can use _(time)___ for visiting your classroom or having your class visit mine. Just let me know well in advance, please.

Attached are the ideas for activities you can include if you wish to extend this unit into the "regular" curriculum.

1 - Provide puzzles, games, word searches or activity cards on plant subjects.
2 - Provide "plant" books in your reading corner (including fiction and non-fiction, simple and difficult).
3 - In the creative dramatics area, set up a produce stand or manufacturing plant for role playing.

Thanks for making the extra effort to help!

Sincerely,

Play Group Ideas

1. Have apple cider and make caramel apples. Play a game of Mr. Potato Head. Play "Farmer in the Dell". Modify this game so that new verses are created; "The farmer picks a carrot." Ask children to bring or suggest plant-related games.

2. Meet at a farm for vegetable picking. Play afterwards. If possible make vegetable soup from the harvest and let the children have it for snack or lunch the next Monday at school.

3. Give a Halloween party and have a) everyone come dressed as their favorite plant or b) provide a plant snack to eat at the party.

PRE-TEST

1. Name several kinds of plants. List as many as you can.______

2. What are the parts of a plant? ____________

3. What do plants need to grow?____________

4. What is the smallest plant you know? What is the largest?

5. Name some plants that we use (but don't eat).____________

6. What is the difference between a fruit and a vegetable? ______

7. What is a farmer? ____________

8. Name a root that we eat.____________

9. What does the word "experiment" mean? ____________

10. What is a botanist? ____________

Exploratory Activities

Language Arts/Exploratory Activities

1. Display fiction and non-fiction books separately about plants, fruits and vegetables, gardening, etc. Observe children to see if they can distinguish the fiction table from the non-fiction. Use these words in conversation; encourage children to classify what kind of book they need or want.

2. Post riddles--Example: (for beginning readers)

   I am red,
   I am juicy,
   I grow on a tree.
   I begin with the letter A.

   OR

   (for advanced readers)
   I am a tropical fruit.
   I am imported from
   South American countries
   Jelly is made from me.
   I start with g. (guava)

3. Print jokes on sentence strips. Each day leave a new one out on your pocket chart for children to rearrange and enjoy. Examples:

   Lem: I had a terrible nightmare last night.
   Clem: What did you dream about?
   Lem: I dreamt I was eating Shredded Wheat.
   Clem: Why should that upset you?
   Lem: When I woke up, half the mattress was gone.

   Lady (in a paint store): Do you have any wallpaper with flowers in it?
   Clerk: Yes, we do.
   Lady: Can I put it on myself?
   Clerk: Of course, if you like, but it would look better on the wall.

Source: Rosenbloom, Joseph. (1978). The Gigantic Joke Book. N.Y.: Sterling.

4. Play fruit and vegetable trivia using nursery rhymes and fairy tales. Examples of questions: "He put in his thumb and pulled out a ____________." Jack and the __________ stalk." Cinderella went to the ball in a coach made from a __________. Snow White ate a poisoned __________. "He put her in a __________ shell and there he kept her very well".

5. Display a Farmer's Almanac. Post a list of questions which could be answered by using it.

6. Set out pictures of plants and labels for students to match. Vocabulary should include: bush, shrub, tree, potted plant, flower; for older students add moss, fern, cactus, mushroom, seedling, etc.

7. Display books about wildflowers, field guides to mushrooms, planting calendars or instructions, grocery flyers with produce sales advertised, seed catalogs, etc. Encourage browsing.

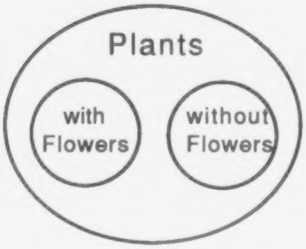
8. Brainstorm out loud or on paper: a) name all the kinds of berries you can think of; b) name all the ways you could cook apples.

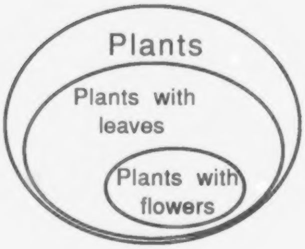
9. Provide several different versions of Snow White and Rose Red or Robert Louis Stevenson's A Child's Garden of Verses. Encourage comparisons of illustrations, etc.

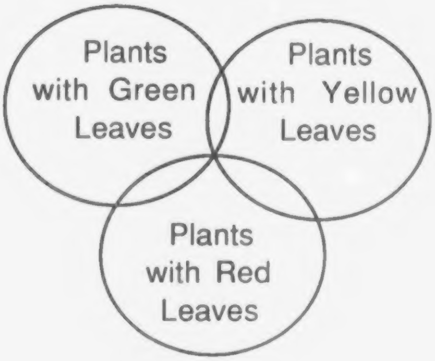
Mathematics/Exploratory Activities

1. Leave a cassette tape and various flowers (with stems and leaves attached) on a display table. Questions recorded on the tape should require counting skills. Examples: The daisy has _______ petals. The rose has leaves on its stem.

2. Display Venn diagrams on a poster as examples. Supply cutouts (large and small circles) with categories for children to play with. Be available to help or supply answer cards with information on the reasoning behind the answer. Note: This activity can be done on an overhead with circles cut out of transparencies.


Plants
with Flowers
without Flowers


Plants
Plants with leaves
Plants with flowers


Plants with Green Leaves
Plants with Yellow Leaves
Plants with Red Leaves

3. Display scale drawings of gardens showing vegetable areas and dimensions. Provide graph paper for children to design their own garden.

4. On a twelve-month poster calendar, mark the planting dates for various crops. (For ideas consult seed packages or farmer's almanacs. For non-readers use pictures of the vegetables or flowers. For more advanced students, provide the blank calendar and planting information and let them construct their own garden calendar. Note: This activity can also be done with seasons instead of months.

Music/Exploratory Activities

1. Display gourds and sticks and encourage children to experiment with playing them. Talk about gourds as musical instruments. (Gourds with dried seeds inside make fascinating sounds.)

2. Play pieces for children and display their titles and composers. Examples: "Maple Leaf Rag"; "Tiptoe Through the Tulips"; "Daisy, Daisy".

3. Leave unfinished chants out for students to use in writing chants. some chant starters are:

Out in a pasture
Late one day
I . . . .

Come, come
Come to my garden.
See, see,
See . . . .

I wish I were a pumpkin,
Hangin' on a vine . . . .

4. Display reed flutes; demonstrate blowing on a blade of grass; display reeds from various woodwind instruments.

Physical Education (Dance)/Exploratory Activities

1. During the week of Halloween, have "Pumpkin P.E. Day. Throw orange marbles into plastic pumpkins, toss inflatable pumpkins through orange hula hoops (hung from the ceiling), toss orange bean bags into decorative Halloween containers or bowls. (Note: McDonald pumpkin containers are great for younger kids because they have bigger openings.)

2. Post signs to encourage bending and stretching. Examples: "Imitate plants that bend or stretch". (Putting up photographs of bending plants helps.) "Stretch and bend while holding these things." (Provide an assortment of objects of different sizes and weights.)

3. Encourage bending and stretching, twisting and turning a) while children are balanced on a box, balance beam or balance board; b) while children move through obstacles.

4. Leave recorded instructions for children and music to accompany the movements. Examples: "Twist and turn with a partner as many ways as possible." "Twist one body part around another."

5. Provide command cards for children to use in pairs. Examples are:
   Swing.
   Swing high.
   Swing low.
   Swing fast.
   Swing slow.
   Swing a leg.
   Swing an arm.
   Swing a hoop.
   Swing a rope.
   Swing on a rope.
   Swing on a ring.
   Swing on a bar.
   Sway.
   Sway alone.
   Sway with a partner.
   Sway like a stalk of corn.
   Sway like a willow tree.
   Sway like a flag in the wind.
   Sway to the left.
   Sway to the right.
   Sway evenly.
   Sway unevenly.
   Sway two body parts.
   Sway hard.
   Sway soft.
   Sway your whole body.

Science/Exploratory Activities

1. Display and talk about bulbs and tubers. Display pictures of the flowers they produce. If possible plant some. (Note: they can be forced even in winter by using special lighting and temperature conditions.)

2. Display plants with pungent odors (examples: mint, eucalyptus). Explain the reason for such odors in nature. Blindfold children to vivify the experience.

3. Put magnets of fruits and vegetables near the magnet board. Spell out "fruits" on one side and "vegetables" on the other side of the board. Observe sorting activities.

4. Talk about "looking with the eyes of a scientist", or using "careful eyes" as you walk around campus or your neighborhood. Collect (individually or as a group) seeds, seed pods, etc. as you walk. Display the collection. Label objects and where they were found. If there are many kinds of items, make a chart of the number and kinds of objects collected.

5. Display the book, Seeds Pop Stick Glide. Next to it put examples of the kinds of seeds pictured in the book for the children to examine firsthand and compare to the text.

6. Provide a tray showing the various kinds of peas and beans. Note: grocery stores will sometimes let teachers have one of each kind free.

7. Have a sunflower seed race if weather permits. Post the directions for planting and the rules for the race. Give each child a seed to plant. Wait. On the given day, measure the plants to decide the winner.

8. Bundle up big straws and little straws to demonstrate xylem and phloem cells in plants. This activity is especially important if you show slides of plant cross-sections. Explain their jobs as "pipelines" up and down the stem.

9. Let the children do the famous celery and food coloring trick. Provide all the materials and directions. Follow-up with a science guided activity, #6 on page 37.

10. Display posters at student height with these titles -"Plants We Eat", "Plants We Drink"; "Plants We Wear"; "Plants for Medicine". Encourage children to add to each list all week. On Friday, discuss the lists.

11. Display (in dishes or pasted on a posterboard) various kinds of seeds. These examples should vary in size and color; label each. Encourage children to bring in seeds to add to the collection.

12. Provide materials for growing alfalfa sprouts or bean sprouts in sponges. Post the directions and let the children try it on their own. Observe and record results.

13. Display various kinds of cut flowers in different vases--one of each will do. Encourage the children to look, feel and smell them.

14. Provide examples of dried and pressed flowers and instructions on how to do this. Display potpourri or sachet and explain the use of each.

15. Make a cactus garden (or several) in plant saucers or other low containers. Talk to the students as you work about why you are using sand instead of soil, etc. Answer questions about types of cacti.

16. Display the different kinds of onions. Show onions "going to seed" and discuss what happens to the onion if it does. What part of the plant is an onion? Discuss tear glands and why you cry when you cut an onion.

17. Post the question: Will bird seed grow? Provide bird seed and soil or sponges for children to use independently.

18. Help the children contaminate Petri dishes (filled with agar) so that mold and bacteria will grow. Store the dishes in a dark, warm place and check them for several days. Note: Fingers, mouths and other body parts provide a wonderful lesson in hygiene.

19. Display various rotten or rotting items - leaves, sticks, etc. Encourage children to look for items to add to your "rotten" collection.

20. Provide a student microscope and prepared slides of mildew (ascomycetes), smut (aspergillus) and mold (penicillin or rhyzopus). Encourage identification from shape.

Social Studies/Exploratory Activities

1. Make a poster (or create a booklet) of newspaper pictures relevant to this unit. Photographs of farmers, giant tomatos, state fair jam contests, etc. are all possible examples. For groups with advanced readers, include relevant newspaper articles as well.

2. Display high school or college geography books with photographs marked showing farms around the world (examples: banana plantations, rice paddies, etc.).

3. Stack several junior encyclopedias on a table with pages marked. Bookmarks made of long strips of paper can be left trailing out invitingly, Words visible on the bookmark should be intriguing. (Examples: "Wow! Look at this!" or "Totally Incredible".) Border art should be vines, leaves, plants, garden rows, etc. Mark entries for "Plants", "Agriculture", "Crops", "Farms", etc.

4. Get brochures or pamphlets from the chamber of commerce, State Department of Agriculture or local plants. Let children sort them into labeled boxes or file folders marked "agriculture" and "industry" or "farms" and "factories".

Theatre/Exploratory Activities

1. Encourage role playing by providing props for a) farm scenes, b) florist shop scenes, c) nursery or greenhouse scenes, d) factory scenes.

2. Provide containers with slips of paper on which are written possible scene starter elements. Encourage pairs to choose slips and try to portray that combination. Examples:

1st Character	2nd Character	Setting
Farmer	Farmer's wife	Tractor dealership
Tractor salesman	Farmer	Farmhouse
Farmer's son	Farmer's dog	Barn
Farmer's daughter	Hired hand	Hayfield

3. Provide pantomime cards for a pair to act out and guess. Examples: planting seeds, picking carrots, eating a banana, etc.

4. Provide caps or costumes (aprons, overalls, lab coats, etc.) for role play in the scenes mentioned in #1.

Visual Arts/Exploratory Activities

1. Make Xerox art using pieces of plants; allow students to make multiple copies of objects or arrangements and then to connect them as a larger work. These copies can also be used for collages made of Xeroxes and real objects. An extension of this activity is the coloring (crayons or colored pencils) of the Xeroxes in fanciful color combinations.

2. Arrange several kinds of potted plants for children to draw. Note: Encourage whatever efforts are made as this will be difficult.

3. Display a stalk of celery and supplies for printing. Ask students to try as many ways they can to get different designs from the celery. Examples: rolling it; cutting it lengthwise; using leaves only; using strings or ribs, using cross-section, etc. Encourage them to combine all these print ideas into a "celery piece" entitled "Piece of celery" (in shades of green perhaps).

4. Arrange fruit for still life paintings by the children. Add new arrangements during the unit (fresh or plastic) as you eat the old ones for snack. Encourage the children to use many media to do their work.

5. Supply materials for printmaking with vegetables. Examples: carrots, green peppers, sweet potatoes, corn, etc.

6. Supply materials for potato prints. Carve some potatoes for children to experiment with and then take suggestions for other shapes or designs they need. Be sure to include both objects and abstractions.

7. Display various kinds of gourds, squash, etc. Allow the children to feel and explore them in many ways. Encourage still life products in pastel or marker.

8. If the timing is correct, let students pick wildflowers and chain them for their hair or for necklaces. Show some of the "Helga" pictures by Wyeth in which wild flowers are painted.

9. Provide a small table loom for experimentation. (Note: Fisher Price has a toy one that is adequate for this purpose.) Provide a variety of cotton fibers (colors and sizes).

10. Provide florist clay or foam and plastic or silk flowers for the students to practice flower arranging. Display books of floral designs for inspiration.

11. Display well-known works of plants, flowers, fruits. Examples: Van Gogh's sunflower works.

12. Display baskets (finished and unfinished) and the raw materials from which they are made. Invite a basketweaver to demonstrate casually.

Guided Activities

Language Arts/Guided Activities

1. Ask an older gifted child to give a report on native and exotic plants. Be sure to give the guest speaker a list of items that should be covered. Encourage him to use examples and pictures. Appoint one student to say or write a thank you to him for his presentation.

2. Ask the children to discuss the difference between a fruit and a vegetable. In the process they will probably need to define them both; give examples of both; argue a little. If the students cannot resolve the differences, ask them to think about it or seek the knowledge elsewhere. Repeat the discussion when children have more information. Discuss sources. (Note: Outlawing parents as sources will make it more interesting.)

3. Invite a parent or friend who speaks Spanish to read to the children in Spanish about plants. The Now You Know Stories are excellent and are written in Spanish with beautiful illustrations. Choose one of the books (see bibliography) and use it for a combined lesson on both plants and Spanish.

4. Ask the children to discuss how they learn things. What sources of information do they use? When they need a question answered, who do they ask or where do they go? Then specifically address the purpose of the unit in learning about plants. How can we as a group learn more about plants? Brainstorm many different ways. Then work your way through the list, adding specific names or dates. Try to accomplish as many of the children's ideas as possible. Post the list for future reference. At the end of the unit, they may think of unexpected ways in which they learned about plants.

5. Provide addresses of companies or organizations which send free information or seeds on request. Also supply stationery. Encourage each child to write to a different place. Gently correct form and content and let the children mail them. Wait for letters and packages! (See addresses under "Free and Inexpensive Teaching Materials".

6. Provide passages for children to read or listen to in which inference skills are used. Example:

> Do you know where bread comes from? Bread and cake, cookies, spaghetti, doughnuts, and cereal are all foods that we get from wheat. Wheat is a grain that looks a lot like tall grass. After it is cut down, it is crushed into flour. when wheat flour is mixed with other ingredients, it can be make into good things to eat.
>
> 1. Are crackers made from wheat?
> 2. Are there other things in bread besides wheat?
> 3. What are several steps in making bread from grain?

Source: __________. (1984). Do You Know? N.Y.: Random House.

Mathematics/Guided Activities

1. Conduct a survey on fruit, vegetable or fruit juice preferences. Design questionnaires. Arrange with an other teacher to survey their class. Tally data. Chart favorites in each category. Display or tell results to the class which cooperated.

2. How many eyes does a potato have? Take a five or ten pound bag of potatoes. Tell the children to count the number of eyes on the potato. Solve the first problem of knowing whether you have counted them all or not. Use tally marks to count the eyes. Post the individual potato's scores. Add and average. Why do some potatoes have more than the average number and some less? Is the number of eyes related to potato size? potato weight? Discuss whether red potatoes or white potatoes would make a difference? How would we find out?

3. Talk about measurements in the farm community, especially bushel and peck. Show children bushel and peck containers. Fill them with peaches or whatever is in season and decide a) how many pieces of fruit would fit in each one and b)how

many pounds of that fruit it equals. If you can, try with another fruit. Are the answers the same? Why or why not?

4. Compare the prices on several cans of green beans. What is the difference between brands? Open them and ask for volunteers to taste test them. What is the effect on price for green beans with other vegetables mixed in? What costs more...frozen or fresh green beans...canned or fresh...etc.? What sizes of cans are available? How much would a fresh bushel of beans cost? How long would it take to preserve it? What supplies would you have to buy? Does your mother freeze green beans? Does she do it because it saves money or because the taste is better? What happens if green beans go on sale?

5. Read and discuss math facts about plants. Examples:

> There are more than 400,000 different kinds of plants in the world.
> Three-quarters of the world's plants are known as green plants.
> Single-celled diatoms measure only a fraction of a millimeter.
> A variety of plants have evolved over hundreds of millions of years.

Source: Janulewicz, Mike. (1984). Plants. N.Y.: Gloucester Press.

Music/Guided Activities

1. Spend several days listening to Bluegrass music. Talk about its origins and the instruments on which it is played. Profile some of the current or legendary bluegrass musicians. (Example: Flatt and Scruggs)

2. Have a rose sing-along; post lyrics on a flip chart. Examples: "My Wild Irish Rose"; "The Yellow Rose of Texas", "Secondhand Rose"; "Rose of Washington Square". Play portions of Der Rosenkavalier and give a brief synopsis of the opera.

3. Spend several days working on chants. If the children are proficient, add hand movements or body movements with the chant.
   Examples:

   Sweet potato, sweet potato
   Sweet potato pie
   I love sweet potatoes
   My oh my!

   (Repeat with any fruit or vegetable used in pies. Let children volunteer suggestions.)

   I have an apple
   What do you know?
   I know it's ripe
   'Cause I watched it grow.

   (Repeat with variations)

4. Play a tape or album of the group Spirogyra. Discuss the name of the kind of music they play. Show a picture of Spirogyra. Ask the students to speculate on why the group chose that name. Explain what the words "spiral" and "gyrate" mean. Ask them to dance to a cut from the album doing spiral movements or gyrating.

5. Teach the song, "Old Cotton Fields Back Home." Play on kazoos or dance after the children have learned the words. (Note: country steps like knee slapping and strutting with suspenders pulled or square dance steps are appropriate.) As an extension, let the children choreograph a dance with boys' and girls' parts.

Physical Education/Guided Activities

1. Use bushel baskets for tossing targets. Keep records daily of the children's success rate. (They can throw plastic fruit or balls.)

3. Stretching and bending movements. (See p. 31-32)

4. Twisting and turning movements. (See p. 33-34)

5. Swinging and swaying movements (See p. 35-36)

6. Play games to enhance non-locomotor activities such as Popcorn, Human Tangles, or Flytrap.

7. Use ribbons, crepe paper streamers or scarves to accentuate non-locomotor movements in a dance. Stress moving with the music played. Assign "parts". (Example: Who wants to Twist? You two may twist and turn. Who wants to swing this time? You three may swing or sway.)

8. Talk about why plants move - when they move - how they move. Do all these non-locomotor movements (Swinging, swaying, twisting, turning, stretches, and bending) as plants would.

Stretching and Bending.

Spatial
MOVEMENT-PATTERN VARIATIONS

Bend and stretch with different supports:
- legs together
- legs apart
- legs crossed
- on toes
- on heels
- on one leg
- on seat
- on stomach
- on side
- on back
- on arms
- on head and arms

Bend and stretch different body parts
- neck
- shoulders
- elbows
- wrists
- fingers
- waist
- hips
- knees
- ankles
- toes

Bend and stretch different combinations of parts with different supports.

DIRECTIONS/PATHWAYS/LEVELS

Bend and stretch
- at high, medium, and low levels
- forward, backward, and side to side
- to trace pathways in the air with different body parts
- curved, straight, and zigzag

Bend one body part in one direction and stretch another the opposite direction.

TIME
Bend or stretch
- slowly
- continuously
- quickly
- to music
- on a drum beat
- evenly
- unevenly

FORCE
Bend or stretch
- farther than before
- hard
- soft
- in the air
- close to the ground
- smoothly
- roughly

TEACHING HINTS

Stress smooth continuous movement; use flowing-type music.
Increase flexibility gradually by using slow, smooth stretching and bending movements.
Strengthen supporting muscle groups to aid in balance.
Practice bending and stretching in many positions and utilizing many body parts.

SKILL CONCEPTS COMMUNICATED TO CHILDREN

Stretch far enough that it hurts a little.
Stretch slowly and smoothly--do not jerk and bounce.
Alternate stretching and bending to obtain maximum effort.
Try to stretch or bend a little farther each time.

Source: Gabbard, Carl, Elizabeth LeBlanc and Susan Lowy. (1987). Physical Education for Children. Englewood Cliffs, N.J.: Prentice Hall.

Twisting and Turning

Spatial

MOVEMENT-PATTERN VARIATIONS

Twist or turn

vary base of support (narrow to wide)	with arms in close
on toes	on one foot
on heels	knees
stiff legged	seat
knees bent	hips
arms high	shoulders
low	head turning only (advanced)

with arms extended in front
in back
to the side

Twist arms

legs	hips
head	upper body
shoulders	lower body

Twist using different supports and above body parts

arms around legs	around tummy
around head	around hips
around waist	around knees

DIRECTIONS/PATHWAYS/LEVELS

Twist or turn	Turn while moving in straight
right or left	curved
up or down	zigzag paths
high level	
low level	

Twist body parts in opposite direction.

TIME

Twist or turn

to music	slow to fast
on a drum beat	evenly
continuously	unevenly

FORCE

Hard	Smoothly
Soft	Roughly

Turn while high in the air or close to the ground

TEACHING HINTS

Stress a wide base of support and lower center of gravity at the start and finish to the movement.
When children are turning, stress maintaining body alignment throughout the movement.
To initiate a turn, first move one body part in the desired direction--usually the head works best--then combine forces as skill progresses.
Practice turns and twists to both sides.
Stress bending the knees and relaxing at the landing from a turn.
Have the children slow their movement until control is achieved.
When children are twisting, stress holding the supporting limbs firm as they twist.
Children should start with quarter turns and progress to half turns and then full turns as mastery occurs.

SKILL CONCEPTS COMMUNICATED TO CHILDREN

Twisting means keeping one or several body parts on the ground while moving other parts around them.
Turning means to lift one's whole body off the ground and move it around.
Land from a turn with knees bent and body relaxed.
Twist slightly first before turning.
When twisting, place one or more body parts firmly on the ground.

Source: Gabbard, Carl, Elizabeth LeBlanc and Susan Lowy. (1987). Physical Education for Children. Englewood Cliffs, N.J.: Prentice Hall.

SWINGING AND SWAYING

Spatial

MOVEMENT-PATTERN VARIATIONS

Supports

- Swing or sway arms and upper body with a wide base of support narrow base
- on toes, on heels
  - legs stiff
  - knees bent
- on one foot
  - knees
  - seat
- Swing or sway legs and/or lower body standing on one foot
  - on knees
  - on seat
  - on stomach
  - on back
  - on shoulders
- Using different supports, vary the extension of swinging or swaying body parts
  - elbows or knees bent or extended
  - ankles or wrists bent or extended
- Swing or sway different parts to the front, back, or side of the supporting body.

DIRECTIONS/PATHWAYS/LEVELS

- Swing or sway
- at high, medium, and low levels
  - right or left
  - up or down
- trace straight
  - curved or
  - zigzag paths with arms, legs, head.
- two body parts in opposite directions.

Time

Swing or sway different body parts

- slowly
- quickly
- evenly
- unevenly
- continuously
- to different musical rhythms
- to a drum beat

Force

Hard
Soft
Evenly
Unevenly
Swing using only force of gravity
Use individual parts then add whole-body movements.

Teaching Hints

Use music to relax children and encourage graceful and creative movements.
Stress dismounting apparatus at the back of the swinging movement, and the need to bend knees upon landing.
Stress swinging through the full range of motions.

Skill Concepts Communicated to Children

Allow the weight of one's body parts to pull into a swinging motion.
Relax the muscles when swinging different body parts.
Hold muscles firm when swaying.
When swinging on bars or rings, let go at the back of the swing and land with knees bent.
By adding more fence by pumping, one will swing faster and may go all the way around.

Source: Gabbard, Carl, Elizabeth LeBlanc and Susan Lowy. (1987). Physical Education for Children. Englewood Cliffs, N.J.: Prentice Hall.

Science/Guided Activities

1. Root various kinds of fruit and vegetable pieces-- an avocado seed, a pineapple top, a whole sweet potato, a potato eye, etc. Talk about what you are doing and why. Send directions home for the students to try.

2. Talk about and show pictures of plants which yield substances of abuse--tobacco, coca, poppies, marijuana. Discuss their products and their effects.

3. Explain the kingdoms--animal, vegetable and mineral. Give many examples of each. Then produce a bag full of objects. Ask children to sort them into these three kingdoms. Explain why choices are correct or incorrect.

4. Provide real plants, flowers, etc. corresponding to the diagrams or drawings on the bulletin board or on posters. Ask the students to point out the parts labeled on each. Note: supply magnifying glasses if needed.

5. Assist each child in planning and making a terrarium or a vivarium. An interesting variation is to have different children choose different climates or habitats for their terrarium (marsh, desert, temperate, etc.) Ask a nurseryman to help you choose appropriate plants.

6. Ask the students to recount the results of the celery experiment. Ask them to hypothesize what will happen if you do the experiment again with carnations and various colors of food dye. Try it and confirm the results. Ask children if the amount of food dye matters, if the kind of flower matters; produce variations of the experiment and try those experiments as well. Discuss results.

7. Ask the children to hypothesize what would happen to a plant (1) without light (2) without water or (3) without air. Ask them (perhaps in groups) to design an experiment which would test their hypothesis. Start with three plants (at least) of the same size and shape. Follow the students' experimental design. Observe changes daily and record them. Evaluate whether the experiments worked and if so, what they showed. (Note: To

deprive the plant of air, cover its leaves with Vaseline or petroleum jelly.)

8. Talk about vines. What kinds of plants grow on vines? What are tendrils? How is planting and tending a vine different from other garden plants? If possible, plant vines or visit a vineyard.

9. Ask children to look around their houses for a suitable container in which to grow vegetables. Old milk cartons, coffee cans, etc. can be recycled for this purpose. The excerpt on page 38 from Vegetables in a Pot, details this activity. Once the children have brought containers, have them start vegetable plants for later transplant. Talk about recycling.

10. Have an older child or a parent give a talk on allergies and hay fever. Ask the presenter to cover a list of words in his/her report (see vocabulary). Discuss the symptoms. Allow children to relate personal experiences.

VEGETABLES IN A POT

If you look around the house, you'll probably find a suitable container in which to grow your vegetables. The following chart should give you an idea of the size of different household containers.

	Quart	1/2 Gallon	Gallon	10 Gallons
Milk Carton	*	*	*	
1-pound Coffee Can	*			
2-pound Coffee Can		*		
Ice Cream Carton	*	*		
Bleach Container			*	
Garbage Can				*

In addition to these containers, you can turn more unusual items into vegetable pots.

A large old shoe (one that nobody wants anymore!) makes an interesting container for small plants. Though a shoe isn't deep enough for root crops such as carrots or beets, it would be fine for leaf lettuce, strawberry, red pepper, and many types of low-growing herbs. The shoe could be made waterproof by filling a plastic bag with soil, then stuffing the bag inside the shoe, with the opening of the bag at the shoe's opening.

And, speaking of plastic bags, any waterproof bag can make an inexpensive container. Sizes vary from small sandwich bags to giant trash-can liners (30 gallons). The bag can be filled with soil, tied shut with a "twist-em".

Source: Herda, D.J. (1977). Vegetables in a Pot. N.Y.: Julian Messner.

10. Discuss the fruit-and-vegetable group and its importance to a balanced diet. Briefly discuss the vitamins this group provides and why bodies need these vitamins.

11. As a group, design an experiment testing the question, "Does sunshine prevent beans from sprouting?" Remind students of other variables--what else does the bean need? Talk about the experiment they may have already done using beans and wet paper towels in plastic bags in the dark. How does the result from that experiment affect the design of this experiment?

12. Discuss the idea that plants are transformers. Discuss the importance of plants in producing oxygen, converting sunlight, conserving soil, creating animal homes, etc. Ask the children to think of all the ways the earth would be changed if plants disappeared tomorrow.

13. Show the chemical test for starch (iodine) and try it on several kinds of potatoes, (fresh, frozen, fried, mashed) and try it on other foods. In each test have students predict an outcome and tell why they think they are right.

14. Talk about manure and compost heaps. What does "recycling" mean in this situation? What does a farmer need manure for?

15. Go on a seed hunt. Open an apple and find the seeds. Have the children describe them. Then ask the children to predict the kind and number of seeds found in oranges. Repeat with other less-well known fruit. Throw in some seedless grapes or a strawberry for fun. (Display the seeds you found and eat the fruit.) Ask the children to make generalizations about seeds and fruit. Then list some exceptions. An extension of this activity is to repeat the procedure with vegetables. Is a tomato a fruit or a vegetable? Can you tell from this experiment? What about a squash or a green pepper?

Social Studies/Guided Activities

1. Talk about the plight of migrant workers especially if they visit your area. Discuss the difficulties for children who move frequently and who work at hard jobs in the fields. Show

pictures of conditions and tell about ways that communities and government agencies help these families.

2. Discuss expressions like "peas in a pod"; "saying something corny"; "apple of his eye"; "couch potato". Classify them as positive or negative. Discuss the relationships or behaviors described.

3. Discuss harvest time and the holidays we now celebrate in the fall. Tell stories and show pictures of harvest festivals. Explain the importance of harvest time to farms and farm families.

4. Talk about processed versus fresh foods. What are additives, preservatives and dyes? What effect do they have on us? Why does our society manufacture foods with these substances? What would happen if food distributors did not put these substances into our food?

5. Discuss manufacturing plants. Give a definition for this kind of plant and give examples of plants in your area. Talk about synoyms (e.g. factory) and brain storm products that are manufactured in plants (e.g. telephones).

6. Discuss some problems of America's farmers: drought, foreclosure, etc.

Theatre/Guided Activities

1. Talk about the process that a seed goes through from planting to being full grown. Show pictures of several stages of that process. Encourage the children to be seeds and grow. Quiet slow music will help them concentrate.

2. Choose students to be an apple, a tree and a hungry child. Have the child pick the apple and then improvise the rest. (Discuss this scene in The Wizard of Oz if they notice the similarity.) Repeat with different children asking for a different outcome each time.

3. Ask the children to be a flower wilting. For accompaniment: Start at the top (treble end) of the piano. Play notes slowly, with pauses, until you (with great dragging) reach the last bass

note. (Note: Be sure that you have left flowers out so that children can observe the wilting process.)

4. Have children be popcorn. Play a percussion instrument to make the popping sound. Emphasize explosive movement. Tell them they must wait to pop until they are so hot they just have to explode

Visual Arts/Guided Activities

1. Ask the children to observe and explain the differences between a real piece of fruit and its wax counterpart. Ask for specific differences and help out with vocabulary problems for younger children. Repeat with real and plastic fruit, real and ceramic fruit.

2. Ask children to design faces for pumpkins; display a variety of eyes, noses, etc. from which to choose. Encourage expressions rather than stereotype faces. As an extension of the unit a) actually cut the pumpkins; b) send the designs home for them to use on the family pumpkins; or c) apply orange, black and green makeup on their faces in their chosen design.

3. Show pictures of gardens with shrubs and hedges forming mazes. Read stories or descriptions of them. If possible show aerial photographs of some of the mazes and have the children trace their way out.

4. Have a scarecrow convention. After sharing the book about scarecrows (see bibliography) ask children to design and bring materials for their own scarecrow. Display them all in the school yard if possible during Halloween week. Note: A nice display can be completed with the addition of hay bales, sheaves, pumpkins, etc.

5. Discuss topiary and show pictures. If your community has a person with this hobby, ask him to visit and discuss it. Share the book, Plant Sculptures or the book The Garden of Abdul Gasazi with the class. (See bibliography.)

Free and Inexpensive Teaching Resources

Garden Place (Catalog 50¢)
6780 Heisley Road
Mentor, OH 44060

Bluestone
3200 Jackson Street
Mentor, OH 44060

Green Horizons
500 Thompson
Kerrville, TX 78028

Conley's Garden Center (Catalog 35¢)
Boothbay Harbor, ME 04538

Mincemoyer Nurseries (Catalog 25¢)
Rt. 526
Jackson, NJ 08527

Woodstream Nursery (Catalog 15¢)
P. O. Box 510
Jackson, NJ 08527

Mollie Byrd
Agricultural Communications
Reed McDonald
Texas A&M University
College Station, TX 77843
(409) 845-7800
(A packet of materials
or publication list.)

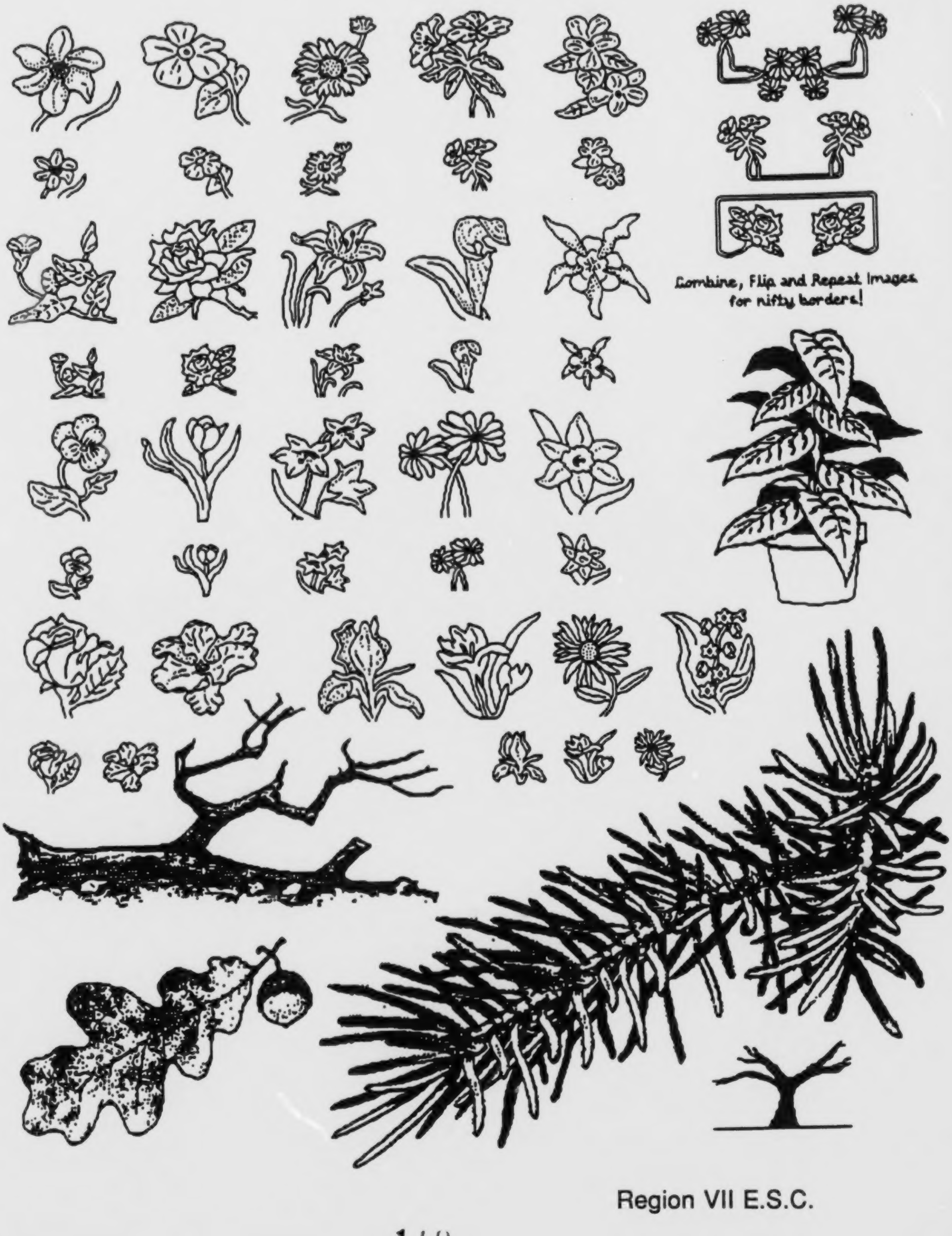
Clyde Robin (Catalog $1.00)
P. O. Box 2855
Castro Valley, CA 94546

Griffey's Nursery
Rt. 3, Box 17A
Marshall, NC 28753

George W. Park Seed Company, Inc.
Greenwood, South Carolina 29646

Roswell Seed Company
P. O. Box 725
Roswell, New Mexico 88201

Contact your County Agent for local planting information. He is listed in your telephone book under "Extension Service, Agriculture".



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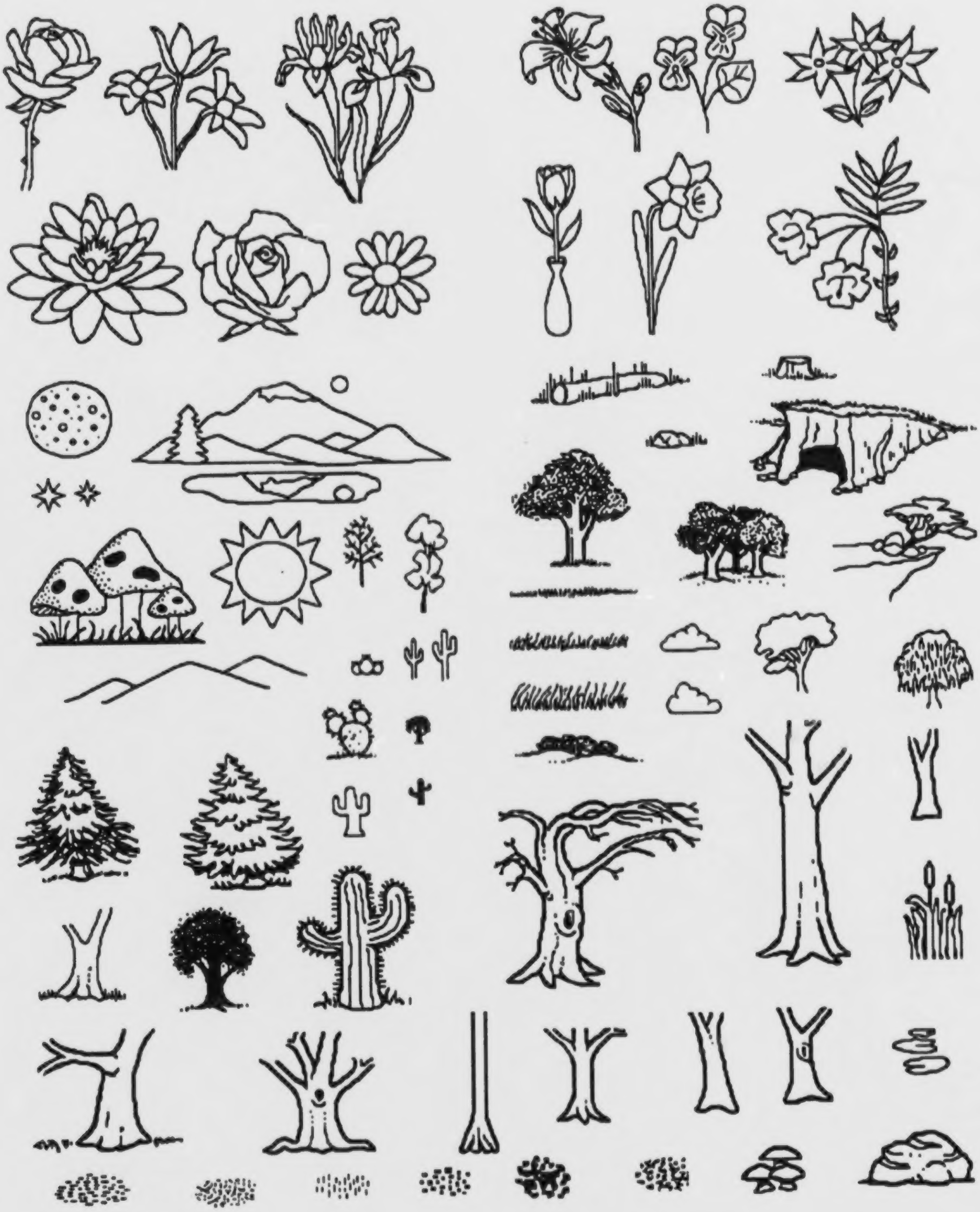

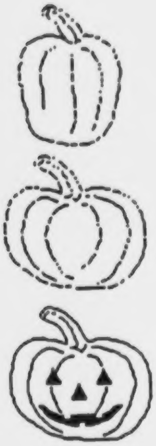

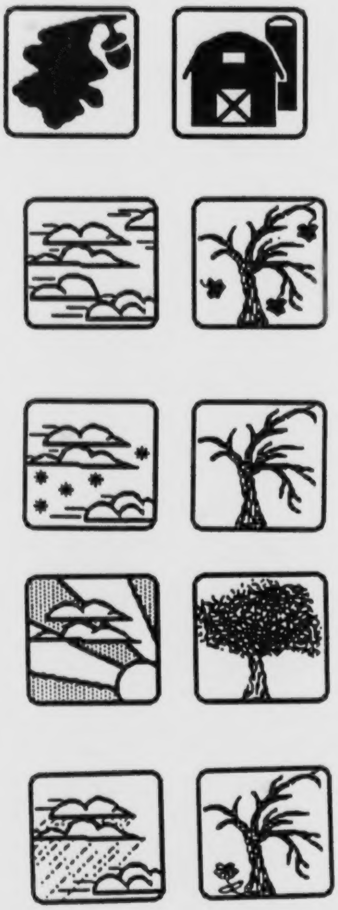

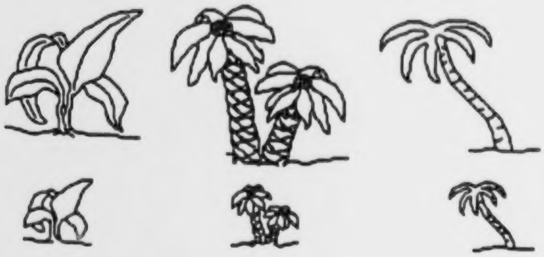

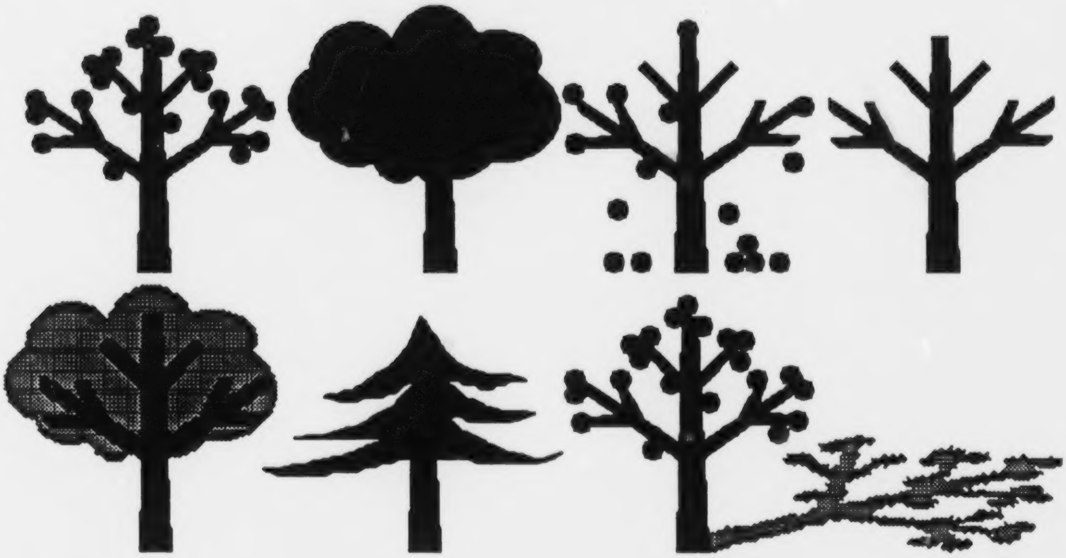

Questions and Topics for Independent Study

QUESTIONS

What is a cornucopia? What does it symbolize?
What do each of these plants symbolize: holly, dogwood, Christmas tree, mistletoe, four leaf clover?
Do bananas grow on vines? Where are banana farms located?
What is the difference between sugar cane and sugar beets?
What is indigo and what is it used for?
What is pollen? Why is it important to bees?
What is Kudzu? Where did it come from?
What is the famous story about George Washington and a fruit tree?

TOPICS

Mushrooms
African violets
Luther Burbank
Johnny Appleseed
Eli Whitney
Making rubber
Poisonous Plants
Carnivorous plants
Allergies to plants or molds
Cacti
Orchids
Bromeliads

Closure Activity

1. Choose a class project to end the unit which involves the planting of a garden or flower bed. If space is not available, try window boxes or planters for various classrooms. Allow the students to choose where they will plant, what will be

planted, who will do each job, and the timetable. After the project is finished, evaluate the work together.

Unit Evaluation

1. Achievement of short term objectives regarding participation and products.

2. Participation in or performance of responsibilities for the class garden project. (Note: List these responsibilities for each child in words the child can read and understand. Post these lists at student eye level. Check off and have the child check off activities as they are completed. See example on p. 50.)

3. Completion of culminating product or performance (individual or group) requiring synthesis of major concepts taught.

4. Adequate score on a teacher made test .

5. Successful interview of student (oral or written) about his learning performance.

Vocabulary

- algae
- allergen
- allergy
- annual
- antihistamine
- asthma
- avocado
- bacteria
- bale
- bean
- biodegradable
- bloom
- bone meal
- brown
- brussels sprout
- bud
- bulb
- cabbage
- cactus
- carbon dioxide(CO_2)
- carrot
- cauliflower
- celery
- charcoal
- chlorophyll
- clay
- composition
- compost
- congestion
- corn
- cotton
- cucumber
- cutting
- dandelion
- data
- decompose
- desert
- design
- eggplant
- fabric
- fern
- fertilizer
- florist
- flower
- foliage
- form
- freezer paper
- fruit
- fungi
- germinate
- gravel
- harvest
- hay fever
- herb
- hives
- hoe
- humus
- immune
- inorganic
- itch
- kernel
- landscape
- leaf
- leaves
- lettuce
- line
- lungs
- manure
- mass
- mildew
- mill
- mold
- mucus
- mulch
- mushroom
- mustard
- nasal
- native plant
- nectar
- onion
- orange
- organic
- oxygen (O_2)
- pastels
- pea
- peat moss
- penicillin
- pepper
- perennial
- pineapple
- plant
- pod
- poisonous
- pollen
- pollinate
- pond
- potato
- print
- prune
- rake
- root
- roots
- rot
- rubber
- runner
- scarecrow
- seed
- seedling
- set
- shape
- shovel
- shrub
- sneeze
- sniffle
- soil
- spice
- spines
- spoonrest
- spores
- stem
- sunflower
- sunlight
- taproot
- tear glands
- terrarium
- texture
- thresh
- tomato
- topsoil
- vegetable
- vivarium
- weed
- wildflower
- zucchini

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Appendix

"Moldy Fruit"

Do an experiment to see how mold grows. find out if mold on a lemon will grow on an orange.

You will **
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*********************mold from the lemon. If it does, you know that the orange can be food for the mold. do you think the mold can grow on other kinds of food? Try growing it on other fruits and on bread. Put moldy fruit in plastic bags next to bread, or an apple, or a piece of cake. Make up your own experiments.

Source: Cobb, Vicki. (1981). Lots of Rot. N.Y.: J.B. Lippincott.

"Catch a Case of Mold"

In the last experiment, the orange is touching the mold on the lemon. But you can get mold to grow without having the food touch the moldy fruit. Mold spores are always in the air. They float and they are carried everywhere by the wind. You can't see them but you can catch them. Here's how to do two experiments for catching mold.

You will need these things:

a slice of bread
a slice of left-over boiled potato
two jars with covers
a magnifying glass.

Put the bread in one jar. Put the slice of potato in the other jar. Sprinkle the bread with water. Leave the jars open to the air for half an hour. Cover the jars. Put them in a closet. Take them out and look at them every day for a week. Use your magnifying glass.

Here's what to look for: Find white fuzzy spots. This is a different kind of mold from the mold that grows on oranges. The fuzz is made up of threads that grow into the food like roots and up in the air like stems. In a few days this fuzz will look black. That's because it's covered with tiny black spores. These spores fly off into the air. They are so small you don't know they are there. When they happen to land on bread or potato or some other food they grow into new mold. There are billions and billions of mold spores in the air. Most of them never get a chance to grow into mold.

You may see blue-green spots. These are also a kind of mold. They are a cousin of the mold that grows on lemons.

You may see the same molds that grow on bread growing on the potato. You may also see shiny round white bumps on the potato. These bumps are made of millions of tiny plants that are much smaller than molds. They are also much simpler.

Source: Cobb, Vicki. (1981). Lots of Rot. N.Y.: J.B. Lippincott.

"Rotten Cotton"

Mold can also grow on things you wouldn't want to eat. Mold can use cotton as food. You can grow a kind of mold called mildew on a cotton sock. Cotton cloth is made from cotton plants. Cotton plants grow fuzzy white balls. These balls have tiny plant threads that are woven into cloth. The threads that make up cloth are food for mildew.

You will need these things:

an old cotton sock that has lost its mate
a plastic bag
a twist tie

Wear the old sock for a day. Get it good and dirty and full of sweat from your foot. Find a deep puddle. Dip the sweaty sock in the puddle. You must do all this to make sure invisible mildew spores get on the sock. The spores are in dirty places as well as in the air. Wring out the wet sock. Roll it up and stuff it in the plastic bag. Close the bag with a twist tie. Put it in a closet.

Check the sock every day for a week. Black specks will grow on it. These are mildew. Mildew grows where it's damp and where there is food like plant threads. Must you have a dirty sock to grow mildew? Do an experiment to find out. See if mildew will grow on a clean wet sock.

Mildew also seems to grow better in the dark. Do an experiment with one sock in the dark and one in the sunlight to see if this is so.

Go on a mildew hunt. Look at old clothes that have been stored in a basement. Books stored in damp places may also grow mildew, because paper is made from the same kind of plant threads as cotton.

Mildew smells musty. This is the stale smell of closed, damp rooms. If mildew grows for a long enough time, it makes cloth very weak. The cloth will fall apart when you pull on it.

Mildew can be a problem in your hamper. Don't put sweaty clothes or wet bathing suits in with the family wash! If the wash isn't done right away, you're asking for trouble! Wet clothes that sit in a hamper for a week can smell up the place. And they'll be ruined!

Mildew is not fussy about its food. Check for mildew in the bathroom. Look in cracks in the tile and on the shower curtain. It grows on plastic, paint, leather, and soap film. See how many places you can find in your house where mildew grows. You'll find that mildew grows anyplace where it is damp and there is some kind of food.

Source: Cobb, Vicki. (1981). Lots of Rot. N.Y.: J.B. Lippincott.

"Dirty and Rotten"

Soil is full of all kinds of bacteria. A good way to rot something is to bury it. Of course, it takes a long time for soil bacteria to finish rotting something. But you can see the beginning of how soil bacteria rot stuff in the next experiment.

You will need these things:

a large flower pot
a spoon for digging
soil form you yard or park
toothpicks
paper and pencil
scissors.

Fill the flower pot with soil. Collect some things to bury. Here are some ideas:

a piece of apple or potato
orange peel
a piece of paper
plastic wrap
aluminum foil
a lettuce leaf.

Make signs for each object. Cut out a small piece of paper. Write the name of the object on the paper. Stick a toothpick through the end like a flag.

Bury each object in a big flowerpot. Stick a toothpick flag into the dirt over each buried object. Pour a glass of water over your experiment. Water it again in three or four days. Bacteria must have water to grow. Bacteria will not grow where it is dry.

Wait a week. Then dig everything up. Wash off the dirt if you can. It will stick where things are getting rotten. That is because bacteria are growing into the food. The soil sticks to the bacteria, and the bacteria stick to the food. Feel the rotting fruits and vegetables. They will be getting soft. If there is a peel, it will not be as rotten as the inside. Peels take longer to rot. They protect apples and potatoes from rot. Peels often have a coat of wax that keeps the bacteria from getting in.

Some things will not be rotten. They simply are not food for bacteria. Paper will rot, but it takes longer than a week. Plastic wrap and aluminum foil will not rot. They cannot be used as food.

Everything that roots is called biodegradable. "Biodegradable" is a long word made up of parts that have separate meanings:

"Bio" means "living"
"Degrade" means "to break down"
"Able" means "having the power to do something".

When you put the word together, biodegradable means "able to be broken down by living things." Biodegradable things end up broken down into crumbs. Rotting completely breaks them down. Litter collects when people toss away things that are not biodegradable, such as bottles, cans, and foil wraps.

If you like, you can bury everything in your experiment again. Dig it up after it rots for another week. Or leave it buried for a month or longer before you dig it up again.

Source: Cobb, Vicki. (1981). Lots of Rot. N.Y.: J.B. Lippincott.

"Which little Rotters Did You Grow?"

BLUE MOLD ROT

Scientific name: *Penicillin*
Appearance: powdery blue-green
Favorite foods: cheese (blue cheese), bread, lemons, peaches, and other fruits

GRAY MOLD ROT

Scientific name: *Botrytis cinera*
Appearance: gray fuzz
Favorite foods: grapes, strawberries, and many other fruits and vegetables

RHIZOPUS SOFT ROT (also known as black bread mold)

Scientific name: *Rhizopus stolonifer*
Appearance: cottony with black dots
Favorite foods: bread and cake, vegetables, fruits

BLACK MOLD ROT (also known as "smut")

Scientific name: *Aspergillus niger*
Appearance: powdery, usually black but may also be brown or green
Favorite foods: vegetables (onions and tomatos), bread, fruit, very sweet stuff such as jellies and jams, and very salty foods such as bacon

GREEN MOLD ROT

Scientific name: *Cladosporium herbarum*
Appearance: Thick, velvety, dark olive-green spots
Favorite foods: fruits and dark spots on beef

MILDEW
Scientific name: *Ascomycetes*
Appearance: black powdery spots on light materials, light spots on dark materials
Favorite foods: cloth, leather, paper, many plastics, paint, and soap film

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BACTERIAL SOFT ROT
Scientific name: *Erwinia carotovora*
Appearance: mushy, water-soaked, sometimes bad smelling; sometimes seen as pink to reddish spots on potato slices
Favorite foods: vegetables and just about any other dead stuff that's juicy

---

BACTERIA COLONIES
Scientific name: *Bacilli*
Appearance: roundish spots. Some may be raised and some flat. Shiny and smooth or rough. Color ranges from white to cream to brown.
Favorite foods: Bacilli grow on most foods but they need more water than molds. Bacilli do most of the world's rotting. They grow especially well where it is warm and moist.

Source: Cobb, Vicki. (1981). Lots of Rot. N.Y.: J.B. Lippincott.

ANIMAL UNIT

ANIMAL UNIT

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ANIMAL UNIT

Background Information

The animal unit is found in almost every elementary curriculum regardless of grade level. This animal unit varies from the norm in several important ways. First, it is longer and more complex than most animal units; second it includes many subject areas and many skills. The more important skills to be developed during this unit are listed below:

> Observation of details, careful observation, observation with record-keeping;
> Comparison and contrast of objects or ideas based on this observation;
> Classification of objects or ideas based on this observation;
> Communication of observations through a variety of media (literature, music, visual arts, dance, theatre);
> Development of an extensive vocabulary and adequate technique to adequately explain, describe or communicate through the arts, these observations.

In addition to developing these skills in the students, this unit will provide experiences on which some of the most basic scientific concepts will be based. These concepts which should be explored and fostered through all the activities are:

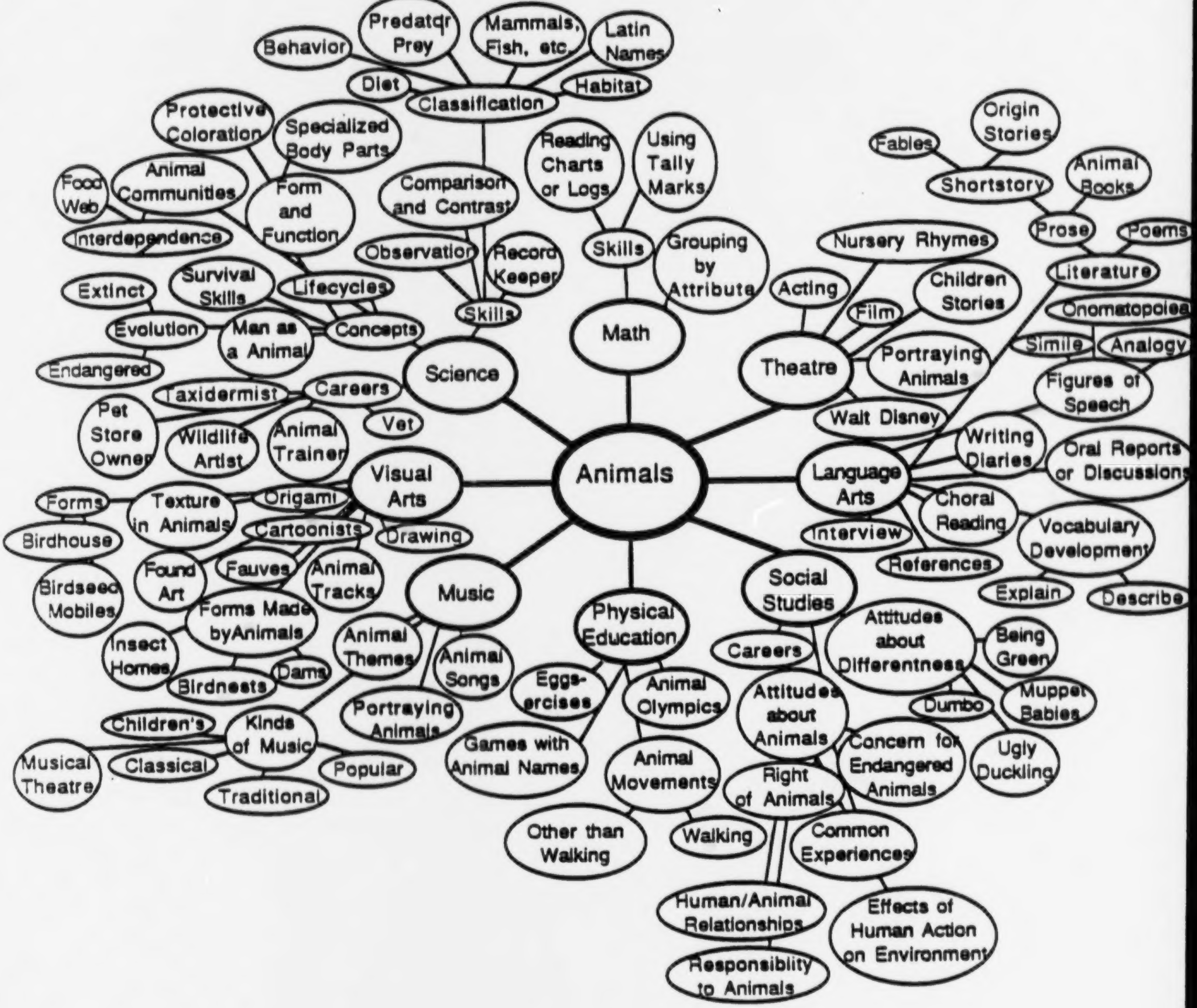
The life cycle of animals;
The interrelationship of all living things;
The basic requirements for all living things;
The survival skills of all animals;
The relationship between form and function in animal structure;
The process of evolution;
Man as an animal.

Implicit in each unit of study are basic attitudes which the society holds and which the unit tries to develop in the students. In this unit, attitudes which should be fostered are:

Respect for the rights of animals;
Responsibility of humans toward animals;
Concern for the effects of human actions on
    the on the natural environment and its
    animal inhabitants;
Commonality of experiences between animals
    and men;
Value of human/animal relationships.

Because this unit is taught so often, perhaps a special word of caution is in order here. This is not a unit about "my pet" or "animal friends". One action which would work against the success of this unit would be to open an old file drawer full of last year's animal unit (designed for average learners) and to substitute familiar (but simple) activities previously used. (Please do not pull dittos of animals for children to color !) A second action which would compromise the effectiveness of this unit would be to exclude the hands-on experiences suggested, which make up a large portion of this unit, as being impractical. Without the observational experiences and direct learning indicated (especially in the science and art sections), the application of this knowledge to vicarious activities (such as writing, speaking, acting, etc.) will be impossible. Deciding at the outset that you are not going to have animals in the class or field trips to see animals will invalidate the premise of this unit. Please do not use the paper-and-pencil or group discussion activities alone. Without concrete sensory precursors, these activities will be meaningless and probably unsuccessful.

Visual Organization of Topics


Animals
Science
Math
Theatre
Language Arts
Social Studies
Physical Education
Music
Visual Arts
Behavior
Predator Prey
Mammals, Fish, etc.
Latin Names
Diet
Classification
Habitat
Protective Coloration
Specialized Body Parts
Food Web
Animal Communities
Form and Function
Interdependence
Comparison and Contrast
Observation
Record Keeper
Skills
Survival Skills
Lifecycles
Extinct
Evolution
Man as a Animal
Concepts
Endangered
Taxidermist
Careers
Pet Store Owner
Wildlife Artist
Animal Trainer
Vet
Reading Charts or Logs
Using Tally Marks
Skills
Grouping by Attribute
Fables
Origin Stories
Shortstory
Animal Books
Prose
Poems
Nursery Rhymes
Literature
Acting
Film
Children Stories
Onomatopoiea
Simile
Analogy
Portraying Animals
Figures of Speech
Walt Disney
Writing Diaries
Oral Reports or Discussions
Choral Reading
Interview
References
Vocabulary Development
Explain
Describe
Forms
Texture in Animals
Origami
Birdhouse
Cartoonists
Drawing
Birdseed Mobiles
Found Art
Fauves
Animal Tracks
Forms Made byAnimals
Insect Homes
Birdnests
Dams
Animal Themes
Animal Songs
Portraying Animals
Children's
Kinds of Music
Musical Theatre
Classical
Popular
Traditional
Eggs-ercises
Animal Olympics
Games with Animal Names
Animal Movements
Other than Walking
Walking
Careers
Attitudes about Differentness
Being Green
Muppet Babies
Dumbo
Ugly Duckling
Attitudes about Animals
Concern for Endangered Animals
Right of Animals
Common Experiences
Human/Animal Relationships
Effects of Human Action on Environment
Responsiblity to Animals

Short Term Objectives

Language Arts

1. The student will increase his reading vocabulary by 50 words.
2. The student will complete at least one writing assignment (a diary or description).
3. The student will conduct an interview, give an informal oral report or participate in a choral reading.
4. The student will explain simile and give an example.
5. The student will explain analogy and give an example.
6. The student will explain onomatopoeia and give an example.
7. The student will listen attentively to guest speakers and classmates 80% of the time.
8. The student will read at least 2 books, fiction or non-fiction.

Mathematics

1. The student will group objects by attribute (size, color, shape).
2. The student will group animals in many different ways according to given criteria (by habitat, by diet, by reproductive method).
3. The student will use tally marks for observations of behavior or incidence.
4. The student will solve word problems of appropriate difficulty with or without manipulatives.
5. The student will read or make charts of characteristics.

Music

1. The student will name correctly 5 to 7 pieces played during the unit or the animal they portray.
2. The student will identify theme music for animal characters.
3. The student will participate in musical activities (listening and responding) 80% of the time.
4. The student will classify correctly 5 of 8 pieces played in the unit according to style - classical, musical theatre popular, children's folksong.

Physical Education (Dance)

1. The student will mimic a variety of animal movements.
2. The student will participate in movement activities 80% of the time.
3. The student will generate at least 5 walks and at least 5 other locomotor movements done by animals.

Science

1. The student will describe animals that he has seen noting size, shape and color.
2. The student will identify food preferences of different animals.
3. The student will classify animals according to those that hatch and those that are born alive.
4. The student will classify animals according to their habitat.
5. The student will describe the difference between farm animals and zoo animals (wild and tame).
6. The student will name animal products which man uses.

7. The student will describe similarities and differences in adult animals and their young and the ways the young are cared for by parents.

8. The student will explain why and how pets need care from humans.

9. The student will suggest possible reasons why animals are endangered.

10. The student will explain the difference between mammals and other animals.

11. The student will describe characteristics of man similar to animals and characteristics of man different from animals.

12. The student will observe and describe differences in the behavior of animals.

13. The student will name animals from various habitats.

14. The student will analyze various body coverings (fur, scales, etc.) and relate these coverings to survival.

15. The student will examine the relationship between body structure and locomotion, food-getting and survival.

16. The student will predict consequences of an animal disappearing from the food web.

17. The student will recognize that animals interact with other animals in their habitat and must coexist to survive.

18. The student will explain the difference between predator and prey.

19. The student will use at least 70% of the words in the vocabulary list correctly in a scientific context.

20. The student will practice record keeping skills writing logs or drawings pictures.

Social Studies

1. The student will explain possible relationships between a man and an animal (adversarial or helping).

2. The student will detail ways in which man affects the lives of animals.

3. The student will explain the value of animals to our society.

4. The student will list 5 to 10 careers concerned with animals.

5. The student will exhibit positive and responsible attitudes toward animals.

6. The student will relate the experiences of animal stories which are different (as told in story form) to human differences and human situations. Example: The Ugly Ducking.

Theatre

1. The student will convincingly portray a variety of animals.

2. The student will participate in at least one improvisation or skit.

3. The student will share ideas on blocking, makeup, sets or props for a skit or play

4. The student will recognize examples of the "animal adventure" film series.

Visual Arts

1. The student will explain the meaning or significance of a) the fauvists b) "found" art or c) protective coloration.

2. The student will identify textures or designs associated with various animals (prickly with porcupines and stripes with zebras).

3. The student will create at least two 2-d products and one 3-d art product.

4. The student will list constructions made by animals.

5. The student will tell about cartoonists and animators and identify cartoon animals.

Field Trip Ideas

1. Visit a beekeeper and her hives. Talk about her job and how she got started keeping bees. Allow questions on getting stings, being afraid, etc. Eat honey from the honeycomb if possible. Share stories about hornets, wasps, etc.

2. Visit a farm (sheep, chicken, catfish) or a ranch (cows and horses). Talk to the owner about his expenses (personnel, animal feed, veterinarian bills, etc.) and his profits. Ask him to tell about a typical day full of chores. Emphasize the difference between animals as pets and animals bred for sale. Talk about whether the children would enjoy having a farm.

3. Take the children to a zoo; visit and talk with the veterinarian in charge of animal care.

4. Visit a large aquarium; ask the students to observe and then draw their favorite animal there. Talk with the supervisor about feeding and caring for the animals. (Note: Children need to know that even a large aquarium must be periodically drained and cleaned!) Discuss why all the fish can't be put into one giant tank; explore the topic of natural enemies.

5. In a city, take the children to feed the ducks (and/or geese). If possible, point out the difference between tame and wild ducks. Identify various kinds of ducks (Merganser, Mallard, etc.) Ask the children to point out similarities and differences between the ducks and the geese. Experiment with different kinds of duck food. Ask children to watch as you (or they) set out various kinds of feed (bread, corn, commercial duck feed). What food wins? (See Bibliography for City Geese.)

6. If your students are not rural children, take them to a barn or to an agricultural extension experimental farm. Make the experience a vivid sensory experience. Ask them to identify smells (manure) and sounds (doves cooing), sights (pitchforks) and tastes (chew hay?). Follow-up when you return to school with a discussion and writing or painting about the experience.

7. Visit an animal shelter. Arrange for one of the volunteers there to talk about the humane treatment of animals, the work

of the animal shelter in pet adoption, the need for limiting the animal population, and the proper care of family pets. An extension of this lesson is production by the children of posters for display in the school about animal care. (See Bibliography for Pets Without Homes.)

8. Visit a psychology laboratory and have the children observe mice or rats doing maze-running. Ask the experimenter about why he does these experiments, how much mice are like humans, funny stories about mice in his mazes, what he has discovered about learning from his work, etc. Follow-up back at school by constructing a giant maze of cardboard or room dividers and time the children as they run it.

9. Visit a veterinarian. Watch him do an examination of a dog and/or acat. Ask him to explain why he does what he does. Allow the students to listen to the heartbeat of the animal if possible. Compare his job to that of the pediatrician. What procedures are the same? What observations does he make about the animal's appearance or behavior? Allow the students to ask questions about animal surgery, animal diseases, lab techniques, etc. to decide what the similarities are to a human hospital. Show animal x-rays if possible.

10. Visit a pet store. Talk to the pet store owner or manager about where the pets in his store come from, which pets are expensive and which are not, what happens to pets that are not bought, etc. Have children add up the cost of getting a new pet--the cost of the pet, the cage, the toys, the food, the feeding and watering containers, etc. Have them add up the initial costs and then estimate the weekly cost as well. Back at school, have the children report informally on the costs of the various animals they chose.

Speaker Ideas

1. Invite a person who has a butterfly collection to share it with the class. Be prepared for pointed questions about the ethics of killing harmless insects.

2. Invite a person who cards and spins wool. Ask her to demonstrate her abilities and to show some of the clothing she has made from the wool. Follow up with a discussion of knitting, crocheting and weaving.

3. Invite a member of the Sierra Club or other preservation group from your area to talk about the work they do. Show pictures of the area in which you live before and after recent housing developments or building booms. Talk about the idea of planning land use and sharing land with many possible uses.

4. Invite an entomologist or pest control expert. Talk about diseases carried by insects and other kinds of damage insects do. Discuss insecticides and give a strong warning about their dangers. If you live in an agricultural area, discuss crop loss, dangers of overhead spraying and optional forms of insect control.

5. Invite 4-H members to talk about their projects and to show pictures of the` livestock they have raised and sold. Ask about what they learned from doing such a project.

6. Invite a local wildlife artist to share his work and to tell how he observes the animals he draws and paints.

Bulletin Board Ideas

"An Animal, A Beast, A Critter"

Allow students to look through your picture files of animals and to choose several that they would like displayed. Ask each student to write a caption for the picture before you put it on the bulletin board. (Note: Unusual pictures will generate extremely creative captions. Search old National Geographic magazines for the best photos.)

"Modern Man = Homo sapiens"

Make a bulletin board showing the scientific names for common animals. Explain at the bottom what genus and species names are. You can also include pictures of Carolus Linnaeus if you can find them and an explanation of why Latin is used for scientific nomenclature. Examples of animals are: dog/Canis familiaris;

cat/Felis domesticus; horse/Equus caballus; house mouse/Mus Musculus; sheep/Ovis aries; pig/Sus scrofa; etc. On Friday, extend the activity by discussing the words we use which are derived from these Latin names such as equine, feline, canine, etc.

"Class, How Would You Classify These Animals?"

Label file pockets with "fish", "mammals" "birds" "amphibians" "reptiles" , "insects" and "other". Supply at least fifty pictures to be sorted by children all week in their spare time. On Friday, go through each folder and decide (as a group activity) whether these animals do indeed belong in that folder. For a group which classifies these animals easily, extend the lesson by talking about arachnids, molluscs, etc.

Snacks

1. Animal crackers, of course. Sing the song before you eat them; or have each child make up an adventure about the animals she eats. Example: Once a bear went a long way from home and met a tiger who wanted to be his friend, but then along came a giraffe who said ....

2. Introduce the children to new and unusual foods (but have the peanut butter and crackers ready) such as goat's milk, caviar, scallops, salmon, etc.

3. Have a "cow day" and eat only foods which come from cows. Have the children make up a possible menu and then choose items from it to serve. Of course, "moo juice" will be featured.

4. Talk about vegetarians and their beliefs. Have an all-vegetable snack one day. Note: Either supply dip to drown the taste of the vegetables or serve them fried as appetizers.

5. Tell the children they will have animal food tomorrow and let them think about the possibilities. First bring out a platter of grass and tell them it's cow food. When they refuse to eat it, tell them you have rabbit food too. Serve lettuce and carrots. (You can tell them you forgot the clover.) Next serve horse food, hay and apples. Discuss animal's teeth and the value of crunchy foods. How many animals do you know that eat candy bars?

For the next three snacks, post the directions. Ask students to make their own snacks by reading and following the instructions.

6. Make "pigs in blankets". Talk about pork and ham products.

7. Make "bugs in a boat". On top of an apple slice put a dab of peanut butter or soft cheese and stick three raisins on top. Paper sails on toothpicks are a nice addition.

8. Make "ants on a plant". Cut small pieces of celery with leaves still attached. Fill with pimiento cheese or philadelphia cheese and put raisins on top in a row.

PARENT LETTER

DATE______________________

Dear Parent,

I believe your child will truly enjoy our next unit, animals. Many special activities, speakers and trips have been planned for the next four weeks. Attached you will find a permission slip for some of these events and a request for you to serve as chaperone on some of these outings. (I realize that you are busy, but without an adequate number of adults, we will not be able to go.)

During our unit we will be working to improve our skills, develop new concepts and examine our attitudes about animals. Some of the major ideas we will be stressing are: learning about animals by observing them carefully; classifying animals according to their characteristics; comparing animals and men; valuing animals and their products; enjoying songs, poems, stories, plays and paintings about animals.

As usual, there are many ways in which you can make this unit more meaningful and exciting for your child. I'm sure you will be able to think of many activities to share with him or her in the coming weeks. Here are a few ideas to get you started:

1. Take your child on a nature walk or go birdwatching;
2. Visit a livestock show or sale at an auction or fair;
3. Visit a museum of natural history, a wildlife park or a taxidermist's office to see the animals;
4. Talk about your values concerning fishing, hunting and wildlife preservation.

Please let me know if you have any ideas or suggestions about the unit or if you have any pets which could visit our classroom. I hope you will be able to help us on the field trips and look forward to seeing you then. Thank you.

Sincerely,

COLLEAGUE LETTER

DATE____________________

Dear Colleague,

When I tell you that we will be doing an animal unit this month, you may think, "Well, I've already done that one," or "I'm saving that unit for after Christmas!" Let me reassure you that I don't think the activities we will be doing will interfere with your study of animals in the regular classroom. If anything, I hope it will augment it and make it more meaningful.

Our approach to the study of animals will highlight several very important skills. Each of the activities the students will do will develop in them one of the following abilities:

1. the ability to make careful observations;
2. the ability to compare and contrast objects based on these observations;
3. the ability to classify objects based on similarities and differences;
4. the ability to communicate one's observations or experience.

As you might guess, we will be doing a lot of hands-on activities and a lot of vocabulary building. I would be delighted to share with you some of these activities in detail and our vocabulary list if you would like to see it. I would also like to include some of your students when we have guest animals, guest speakers or on field trips. Please be thinking about which students in your room would profit from or truly enjoy such adventures. Nearer the date of each activity, I will send a note asking for specific names.

As usual, I have included a list of related activities should you want to include them in your classroom schedule this month. Please feel free to visit my room or call me at home if I can be of any help.

Sincerely,

Related Activities for the Regular Classroom

1. Free Reading Area Emphasis: Listening Practice

Provide audiocassette tapes for children to listen to (or combination tapes which allow them to listen and read) at the reading area. Examples: Bambi, 101 Dalmatians, Lady and the Tramp, Jungle Book.

2. Science Center or Area Emphasis: Visual Images

Provide a viewmaster and slides of animals or animal adventures.

3. Writing Table or Center Emphasis: Description

Provide shape booklets at a creative writing area for children to write poems or stories about their favorite animals. If you have an aquarium in your room, fish shapes might be appropriate. Encourage the children to think about being a fish, to observe the fish, to look at books about fish before they write.

4. Free Reading Area Emphasis: Authors and characters

Create a display about authors who wrote series of animal adventures. Encourage children to read many of the books in the series in their spare time. Examples: Winnie the Pooh books, Blackboard Bear books, Paddington Bear books, Beatrix Potter's tales, Frog and Toad books, Babar the Elephant books, and Berenstain Bear books.

Play Group Activities

1. Ask students to bring stuffed animals. Set up play areas such as a zoo, a circus, a farm, etc. Allow the students to construct cages or barns from cardboard boxes. (Note: Have parents do the cutting.) End with a circus performance of animal acts.

2. Provide (or ask students to bring) games about animals such as Animal Lotto, Animal Match Games, Memory (animal set), and other animal puzzles or games. Spend the afternoon trying all the games. Serve monkey food (bananas) and bird food (sunflower seeds).

3. Sponsor a pet parade (a best pet contest is risky) or pet show. Invite other students to participate. Take pictures of all the pets and owners for display later. Supply adopt-a-pets (perhaps from the local shelter) for children without pets.

PRE-TEST

1. Name four things that all animals do. ____________________

____

____

2. Is a human being an animal? Why or why not? ____________

____

____

3. How can you tell a plant from an animal? ______________

____

4. What is a habitat? _________________________________

____

5. Name three mammals. Are you a mammal? _____________

____

____

6. What is a food chain? _______________________________

____

7. What does nocturnal mean? __________________________

____

8. Are you a carnivore? _________________________________

9. Explain how a fish and a frog are alike. _______________

____

10. Explain how a fish and a frog are different. ___________

____

Animal Unit

Exploratory Activities

Language Arts/Exploratory Activities

1. Provide back issues of National Geographic World magazine for children to skim or read.

2. Provide traditional animal fables, especially Aesop, for them to read.

3. Post riddles about animals. Example: Why does the elephant like to travel? Because his trunk is always packed and ready to go. (Note: Chicken jokes are fun too!)

4. Provide a pocket chart with a matching exercise using the name of the animal and the name of the young. For younger children use dog/puppy; cat/kitten; cow/calf; horse/colt; chicken/chick; duck/duckling; sheep/lamb; frog/tadpole or polliwog. For older children use: goose/gosling; bear/cub; deer/fawn; fox/kit; fish/fry; rat/pup; whale/calf; butterfly/caterpillar; human/baby; goat/kid.

5. Provide a pocket chart with a matching exercise using the name of the animal and his animal community: cow/herd; bird/flock; lion/pride; dolphin/pod; geese/gaggle; fish/school; goat/flock; sheep/flock; horses/herd; ant/colony; bee/swarm.

6. Provide a pocket chart with a matching exercise, the name of a body part and either an illustration of that part or a picture of an animal which has that part. Examples: beak, claw, gill, horn, tusk, antler, fin, hoof, trunk, tail, mane, tentacle, fang, wing, antenna, hump, spine.

7. Post a sign which lists these titles. You may want to put the pronunciation in a column next to the word, and an explanation as well. Example:

icthyologist	a person who studies fish
biologist	a person who studies life
zoologist	a person who studies animals
entomologist	a person who studies insects
ornithologist	a person who studies birds
herpetologist	a person who studies snakes

8. Post poems about animals or leave out a notebook with these poems in it. Examples:

"A Poem on the Neck of a Running Giraffe" by Shel Silverstein
"Toucans Two" by Jack Prelutsky
"The Zebra" by Jack Prelutsky
"The Giraffe" by Ron Padgett
"The Eel" by Ogden Nash
"The Giant Crab" by John Walsh
"The Lama" by Ogden Nash
"The Eagle" by Lord Alfred Tennyson
"The Bat" by Theodore Roethke
"Bats" by Randall Jarrell
"The Crocodile" by Lewis Carroll
"Two Haiku" by Basho

Note: All these selections are included in The World Treasury of Children's Literature. See bibliography.

9. For advanced readers, provide a folder of short stories. Selections about animals might include: "Blue Moose" by Manus Pinkwater; "Harry Cat" by George Selden; and "How Many

Donkeys?", an anonymous folk talk from Turkey. Note: All these selections are included in The World Treasury of Children's Literature. See bibliography.

10. Make a poster or work sheets with the beginnings of a poem such as the following.

If I were a dog,
I'd ______________________
If I were a cat,
I'd ______________________
If I were a horse,
I'd ______________________
If I were a frog,
I'd ______________________
If I were a bird,
I'd ______________________
But I'm not; I am me.
So I guess I'll ______________________.

11. Provide audiocassette tapes of animal stories for the children to listen to independently. Suggested titles are:

"Whale Fire", (I984) Produced by Children's Radio Theatre.
"The Unicorn in the Garden" by James Thurber, (I972) Produced by Caedmon.
"The Jungle Book" by Rudyard Kipling (I983). Produced by Music for Pleasure Limited.
"The Dancing Granny and other African Stories" (I985) Produced by Caedmon.

12. Display magazines which address wildlife and conservation concerns. Examples are:

Your Big Backyard published by the National Wildlife Federation.
Ranger Rick published by the National Wildlife Federation.
National Geographic World published by The National Geographic Society.
Zoobooks published by Wildlife Education Limited.

Mathematics/Exploratory Activities

1. Put out plastic animals or pictures of animals. Ask students to sort them in various ways.

2. Leave out Teddy Bear counters. Post problems (or record problems on a cassette) for children to solve with the counters. Example: Seven teddy bears went on a picnic. When they got to the park, one left because he had forgotten the honey at home. When he came back with the honey, he had his little sister with him. How many bears were there at the park on the picnic?

3. Display a chart for the children to fill in. Make it as difficult or simple as your group needs. Provide a reference book with illustrations to settle arguments. (Note: Part of the fun of these chart is the confusion over what you are counting. I was thinking of legs; for the first and tails for the second but you may think of other things.)

Name	Number
Human	2
Horse	
Duck	
cat	
Dog	
Fish	0

Name	Number
Hyrax	
Manatee	
Tamarin	
Newt	
Ocelot	
Wallaby	1

Music/Exploratory Activities

1. During other activities, play music about animals for the children to hear and react to. Post the name of the piece of music and the composer's name while the music is played. Suggested pieces of music are: Carnival of the Animals by

Saint-Saens; "Afternoon of a Faun" by Debussy; Pictures at an Exhibition (especially the "Ballet of the Chicks in their Shells") by Mussorgsky; The Red Pony by Aaron Copeland.

2. Provide traditional music for children to choose and play which has animal themes or titles. Examples: "The Old Gray Mare", "Frog Went A-Courtin'", "There Was an Old Lady Who Swallowed a Fly", "Turkey in the Straw", etc.

3. Provide Disney favorites for children to listen to independently. Examples: soundtracks from Lady and the Tramp, Doctor Doolittle, etc.

4. Provide classical music with animal titles or subjects for independent listening. Example: "Flight of the Bumblebee" by Rimsky-Korsakov, Grand Canyon Suite by Grofe´ (especially "On The Trail"); and The Lark Ascending by Vaughn Williams.

5. Provide popular music for independent listening. Examples: "The Tiger Sleeps Tonight", "The Baby Elephant Walk", etc.

6. Provide the score and soundtrack from the Broadway hit "Cats" and the work from which it was taken, Old Possum's Book of Practical Cats by T.S. Elliot.

Physical Education/Exploratory Activities

1. Bring flippers or slipper or snow shoes that mimic the shape of animal feet for the children to walk in. (Fuzzy bear slippers with plastic claws are a favorite.) Encourage children to see how various shoes affect their walk.

2. Display sport shoes with various soles and cleats. Label for which sport they are suitable. A follow-up guided activity would be to compare cleats with animal's claws or hoofs (for traction, speed, etc.)

3. Buy tubular knit and use it as snakeskin. Allow children to pull it on, tuck their arms inside, and then wiggle and slither. (Designs for poisonous snakes can be appliqued or glued on for added realism.)

4. Build cardboard box cages for temporary zoo. Encourage children to move within the "cage" as the animal would. Ask questions about movement restricted by space and by the number of levels or apparatus (rings or bars or perches) provided. As a follow-up, have children design a second zoo that have habitat areas instead of boxes and interesting movement environments for the "animals". Example: Allow children being monkeys to design an area for movement that monkeys would like.

5. Provide experiences for hanging and swinging. If suitable trees for climbing are not available, use knotted ropes, rope ladders, bars and rings in the gym.

6. Make and obstacle course with many levels requiring animal movements. Examples: Jump like a kangaroo to this place; then slither through this tunnel; swing like a monkey across these rings; then carefully walk down these steps like a mountain goat.

Science/Exploratory Activities

1. Try to bring to the classroom as many live animals as possible. Children will want to share pets one day; pets from other classrooms can visit too. Lab animals from local research institutions can also be borrowed for a short time. Pet store owners can refer you to people in the area who have unusual pets. Try to find as many of these animals as possible for a visit during this unit: rabbit, mouse, hamster, gerbil, dog, cat, bird, turtle, frog, chick, guinea pig. Optional: hawk, snake, gila monster, rat, ferret, spider, salamander, etc.

2. Buy several kinds of crickets from a bait store and put them into a terrarium or other quasi-natural environment. Allow the students to observe them casually. If interest persists, suggest observational experiments about movement, feeding, etc. that the children can perform using tally marks. Display results. Invite an entomologist to comment on the children's findings.

3. Buy several kinds of worms (also from a bait stand) and put them in a large dishpan full of earth. Allow the students to dig

through the dirt to find and hold the worms. Allow regeneration experiments only if you are prepared to discuss the ethics of using animals as research subjects.

4. Order an ant farm and leave it out as a temptation. Allow older students to assemble it and read directions. (Note: You will want to do the actual ant transplanting for safety reasons.) Ask children to draw or measure the number of tunnels which appear each day.

5. Supply the necessary supplies for an aquarium and several books on aquariums and fish as pets. Form a committee of interested students to read about the process, plan the number and kind of fish and plants needed, do the shopping, and complete the aquarium. (Note: Double check their measurement of chemicals for the water as it is a critical step in the procedure and will result in heavy consciences if they are incorrect.) Post sign-up sheets for aquarium care for the rest of the year.

6. Collect tadpoles if possible for the children to watch over the course of the unit. Appoint a tadpole watcher to draw the tadpoles as they develop. (Note: Add screen over the tadpole bowl before they jump out.) Make a ceremony of the release.

7. Supply bug motels (small containers covered with screen) to anyone who would like to go bug-hunting. Share the bugs found daily with the group and then release them. Hints for the bug collectors: put syrup on the ground and come back later; smear jam on a tree and come back later; put a brick on the ground and come back much later; dig a hole, cover it and come back later.

8. Use an old or cracked aquarium to make a vivarium and fill it with insects and amphibians (reptiles if you can stand them). When it clouds over, answer the children's questions about the balance needed between plants and animals.

9. Leave out a collection of sea shells for the children to sort, classify and play with. Lay a book about sea animals next to them for reference. (See Bibliography.)

10. Put out a magnifying glass (or several sizes of them) for the closer examination of snake skin which has been shed, locust shells, etc. Answer questions about molting and shedding.

11. Start (or display) a collection of bird nests. Try to provide a variety of styles of construction. Provide books on bird nests and a field guide to North American birds as well. (See Bibliography.)

12. Dump several sets of plastic animals (wild and tame) into one plastic bin. Put smaller containers labeled "farm animals" and "zoo animals" or "tame animals" and "wild animals" next to it. Check the sorting which results and ask children reasons for their classifications. For more advanced students use these categories: diurnal/nocturnal; herbivore/carnivore; lays eggs/live young.

13. Play albums of animal's songs while the children are doing any of the above activities. Especially enjoyable are the whale songs and frog songs.

14. Display animal skeletons (real or plastic) for the children to look at and compare. Biology departments or veterinarians may be able to supply skeletons or be resource persons.

Social Studies/Exploratory Activities

1. Display pictures of animals and humans together. Encourage children to talk about their experiences with animals (positive and negative), fears they have relating to animals, experiences of others in their family. Suggest possible ways that animals and humans can relate to each other. Examples: pets, friends, companions, caretakers (veterinarian), helpers (seeing-eye dogs), etc. (See bibliography.)

2. Students can draw or record experiences about when they were "in the doghouse", "caught cat-napping", "went fishing for trouble", "ducked out on a friend", "pigged out at a meal"

3. At the listening station, present the record "The Day Jimmy's Boa Ate the Wash" (Caedmon, 1980). Provide art materials for the children to draw as they listen.

4. Allow the children to show the filmstrip "The Girl who Loved Wild Horses" from the book by Paul Goble published by Random House.

5. Post or pass out a reading list of works which explore the relationship between children and their animals. Examples: Old Yeller, National Velvet, Black Beauty, etc.

6. Display books or book jackets from the James Herriot books; if possible, provide information on the author or on veterinarians to accompany it. Examples: Moses the Kitten, Only One Woof, Bonnie's Big Day.

Theatre/Exploratory Activities

1. Provide animal costumes, masks, or animal hoods for the children to wear and use in improvisations. Note: animal noses are also available commercially.

2. Provide costumes, props or a bridge for "The Three Billy Goats Gruff" and a story synopsis or book for the plot. See what happens without intervening in the drama.

3. Post a sheet low enough for the children to write on. Label it "Famous Animals of TV and Movies". Ask them to write whatever comes to mind. Examples: Mr. Ed, the talking horse; Toto; Lassie; etc.

4. Arrange for VCR tapes that the children can check out for viewing at home. Disney titles include: Big Red, Benji, Old Yeller, The Ugly Dachshund, The Bears and I, Doctor Doolittle, Incredible Journey, The Lone Wolf, and Thomasina. Encourage children to discuss the films when they return them (with you or with their friends). Allow time for movie reviews if the children want to give them.

5. Provide folders with humorous poems about animals (typed in primary print) so that children can read them easily in performance. Also provide a podium or lectern of the right height. Encourage impromptu poetry readings.

6. Post a sign that asks, "Can you....bray, whinny, mew, yelp, yowl, bay, hiss, coo, chirp, cluck, quack, honk, bark, trumpet?" Be prepared for extended animal noises. When students have tired of the sound effects, invite animal pantomimes. An extension of this activity is a guided activity in which children pantomime animal movements and the audience responds to the pantomime with the correct animal noise.

7. Provide theatrical makeup and several guides to doing animal faces with that makeup. Note: Be sure to allow plenty of time, tissue and cold cream for cleanup. Encourage variations on the makeup designs you have provided.

Visual Arts/Exploratory Activities

1. Display photographs (black and white if possible) of various animals' hide, fur, skin, etc. Try to choose photographs that emphasize the differences in texture. Fluffy Chickens, wrinkled elephants, scaly fish, plated armadillos, smooth eggs or frogs are examples.

2. Hang paintings or prints of animal subjects.. Display art history books with pages marked on noteworthy pieces. Examples: "Fish Magic" by Klee, "The Peaceable Kingdom" by Hicks, or "The Sleeping Gypsy" by Rousseau.

3. Provide stencils of animals shapes or animal stickers which can be combined by students to do landscapes of different habitats or pictures of zoos.

4. Display objects made of leather, leather tools; skins of various animals if possible; hides of various animals. Encourage the children to explore them with their eyes shut.

5. Borrow animal sculptures or stuffed animals for models if the children want to draw animals.

6. Display a book on shadow puppetry and some animal silhouettes that the children can use to create a puppet show.

If possible find a book on making animal shadows with your hands and provide a sheet and light for practice.

7. Provide clay and encourage animal forms of various sorts, especially animals in motion.

8. Display mud dauber or hornet nests. Encourage the children to try to duplicate these forms with mud or clay.

Guided Activities

Language Arts/Guided Activities

1. Create choral readings from these poems about animals: "The Panther" by Ogden Nash; "The Cheetah, My Dearest is Known Not to Cheat" by George Barker; "Snail" by Maxine Kumin; and "The Song of the Jellicles" by T. S. Elliot. If the children wish, perform the choral readings for a student or parent group. Note: Unison work will be most appropriate for beginning students; vary that with "All Boy" and "All Girl" sections. For older students with some experience in choral reading, assign parts and divide lines to make the reading more difficult.

2. Write the poem "Cat" by J. R. R. Tolkien on a large sheet of bulletin board paper and hang it for everyone to read. Ask children to find rhymes and near rhymes. List words the children are not familiar with and take five minutes to look them up in a child's dictionary. Ask children what vowel sounds are used most often? Are these the sounds of a cat? Ask them to comment on the meaning of the poem. Ask them to decide if they like the poem and whether they would recommend it to friends and why.

3. Generate similes using animals for comparisons such as: quiet as a mouse; strong as an ox; stubborn as a mule, sly as a fox. Talk about what a simile is and why these animals have those reputations. Generate other similes such as happy as a ______; as wise as an ______; as mean as a junkyard ______. Let the children nominate animals other than those traditionally used and justify their nomination.

4. Talk about expressions that have come from animals. Show a list such as this one: dogtag, dogtrot, dogpaddle, dogeared, doggy bag, dogleg, dognap, etc. Ask for volunteers to explain what the term means and to use it in a sentence. Generate another list for cat, horse, or other animals. If the children get stuck, send them to the dictionary for help.

5. Brainstorm activities to develop vocabulary and fluency: animals that lay eggs (don't forget crocodiles); animals that

fly (don't forget squirrels and bats); animals that live in the water (don't forget the microscopic ones).

6. Tell the children several origin stories, that is, tales of how things came to exist. There are many origin stories such as how the elephant got his trunk. Then let the children make up an origin story of their own. Record it or write it down for sharing with others. Parent volunteers can print it neatly on posterboard for display. An example of this type of story is "How Spider Got a Thin Waist: A West African Folktale" by Joyce Arkhurst. This tale can be found in The World Treasury of Children's Literature by Clifton Fadiman. Another is How the Leopard Got His Claws by Achebe. (See Bibliography.)

7. Tell stories that follow the "Why" format such as Why Mosquitoes Buzz in People's Ears. (See bibliography.) Ask students to make up stories (if they haven't already done activity #2) to explain why a certain animal acts as he does. Example: Why the Hyena Laughs.

8. Do alphabet animals by showing any child a letter of the alphabet. The child then has ten seconds to name as many animals whose names start with that letter as he can. (Note: Show discretion on letters like x and u).

9. Share books about mythical animals and especially animals which are combinations of several animals (examples: gryphon, chimera). Ask the children to put several animals together, to draw the new animal and to name it.

10. Discuss imaginary animals (such as unicorns) and animals which are reported but not believed widely (such as bigfoot). Ask students what kind of proof one would need to settle the argument about the existence of such beasts. (Examples: clear photographs, skeletons, an animal in captivity, etc.)

11. Ask students to name mythical beasts which are part human and part animal. Read stories to them about Pan, mermaids, and centaurs. Ask them to decide which animal part they would like to add to themselves and why. Encourage them to draw or write about what it would be like to be half-child and half-animal.

12. Ask for volunteers to talk about an animal topic. Children could choose breeds of dogs and cats; types of wild cats (lions, leopards, cheetahs, jaguars); or animals native to your area. For beginning students, provide a list of questions which they might answer with their research. Note: If the students have not had opportunities to give oral reports, make this first experience both informal and positive.

13. Ask each child to take a turn telling about an exciting adventure he had with an animal. It may be a story about walking in the woods and seeing an interesting animal; it may be about holding an animal in a petting zoo; or it may be about a new pet and the excitement of choosing it and bringing it home. Encourage good speaking style (volume and rate) and good form (a beginning, middle and end).

14. Because there are so many vocabulary words in this unit, choose one or several words each day to discuss as you begin the lesson. Be sure to give examples of each. One week's words might be: carnivore, omnivore, herbivore; marine, aquatic; amphibian, reptile; predator, prey; diurnal, nocturnal.

15. Have listening practice one day by reading a short paragraph about an animal. After the paragraph, ask the students to repeat what you said about the animal's habitat, diet or natural enemies. Read another paragraph and ask for details about the animal's appearance. Read a third paragraph and ask where in the world this animal can be found.

16. Share the books with your class,.Diary of a Rabbit, by Lilo Hess and The Diary of a Church Mouse by Graham Oakley. Explain what a diary is and its purpose. Encourage them to write a short diary in which the speaker is an animal. The structure of the diary (if they need one) might be: animal in pet store or in the wild, animal bought or captured, animal's new house; making friends with the captor or new owner. Read them to see how the children change perspectives. Discuss your reactions to them.

17. Ask students to take a worksheet home and interview one of their parents or grandparents. Note: You may have to introduce interviewing techniques as part of this activity. The answers to these questions can be shared orally or can become the basis for a paragraph or story. (See next page.)

Pet Interview

Person Interviewed:______________________

1. What kinds of animals did you have around your house when you were growing up?______________________

2. How many pets have you had in your life?______________________

3. What was your favorite pet?______________________

4. Did any of your pets ever get in trouble?______________________

5. Where did you get your pets?______________________

6. What happened to your pets?______________________

Note: for primary students, a tape recording can serve as the product rather than written answers.

18. Take the children to a library and show them that books about animals can be found on the fiction and non-fiction shelves. Explain the Dewey Decimal System briefly and give them the numbers for books about animals, books about caring for pets, etc. Then show them reference books for animals in the reference section and magazines about animals if your library has them. Stress that your librarian can help you find where in the library the book you need will be. Note: Your librarian may also have filmstrips, cassettes and paintings of animals to share. With older children, introduce the card catalog.

19. Explain analogies if the children are not familiar with them. Display several for practice such as:

    bee/hive as beaver/________
    horse/colt as cat/________
    sheep/bleat as chicken/________
    fish/swim as bird/________
    bull/cow as rooster/________

    Make the analogies as hard as your group needs. Ask each child to contribute one analogy for a worksheet. Type the worksheet and do it as a guided activity on a subsequent day. Talk about the reasoning as you do them.

20. At the end of the unit, discuss the kinds of literature you have read. Ask the children to list them: poems, stories and tales, books. Ask them to review the difference between fiction and non-fiction stories about animals. Ask them to review what anonymous and author mean. Allow lots of comments about the favorites they have in each of these categories and their reasons for choosing these specific works. If there is time share some of the writing done by students (with their permission) for this unit.

21. Discuss onomatopoeia with regard to animal sounds. Ask the children to say these words making them sound like their meaning.

    Example: say "snarl" in a very snarly way.

    Also: hiss, growl, bark, purr, yowl, screech, meow; cluck, etc. Make up a poem about all the animals and their sounds,

possibly called "The Animal Song". Let everyone contribute several lines.
Note: you may have to supply a beginning and an ending. Reproduce it for everyone and if interest remains, do it as a choral reading. Extension of this lesson is to add it to the choral reading performance in activity 1 of this section.

Mathematics/Guided Activities

1. How can we classify animals? Have the children think of all the attributes by which we could divide them into groups. Example: color, size, diet, habitat, number of legs, etc. Take a group of ten animals which the children like and try different classification systems.

2. Talk about baby animal size(wight, length or height), gestation period, litter or brood size, etc. Compare statistics for pets with those for wild animals. Example: Kittens and lion cubs.

3. Using plastic Easter eggs, do word problems (written or oral) about birds including number laid, number hatching, number eaten by predators, etc. After several sample problems, ask each child to make up a problem for the group to solve.

4. Read an imaginary log about a scientist observing gorillas (or use the children's bird watching records). Convert the data into bar graphs by day or by species.

5. Make a large chart representing any inventory of all the animals in a zoo. Write in changes in the animal population due to births and deaths, new animals purchased, animals swapped with other zoos, etc. Ask for other ideas for students. Then ask for a grand total or sub-totals by types of animals.

6. Use animal information cards or other references to help children find answers to questions such as these:
    Which animal (and elephant or a tortoise) lives longer?
    Which animal (a shark or a guppy) has more young?
    Which bird (a robin or a Canadian snow goose) migrates farther?

   Then ask children to generate their own questions; swap and repeat the exercise.

Music/Guided Activities

1. Discuss the use of various instruments to represent animals in "Peter and the Wolf" by Prokofiev. Note: There are some narrated versions which explain these musical symbols nicely. Let the children lie quietly through the piece of music imaging what becomes of Peter, his grandfather, the cat, etc.

2. Play "Tubby the Tuba" and let the children listen quietly with eyes closed or allow them to draw Tubby and his friend, the frog. Discuss how frogs and tubas are alike and different. Note: The version by the Boston Pops and Julia Child is wonderful!

3. Sing an extended version of "Old MacDonald" and let the children generate as many verses as they can. (You can tell them that the old record for most verses is 26 animals.) The only stipulation is that they must be able to make the noise that the animal makes; squirrels, etc. are therefore not acceptable.

4. Listen to selections from the tape "Beasts by the Bunches" produced by Clover Patch Collection. Ask students to characterize the time signature for some of them, to identify bass or treble instrument sounds, to tell you if the sound is equalized, to comment on the tempo. Allow student to clap measures if they like.

5. Show the filmstrip for "Frog Went a Courtin'" by Langstaff and Rojankovsky (produced by Weston Woods). Comment on the rhyming pattern. Encourage children to make up extra verses. Play the melody on another instrument and ask the students how many of the verses they can remember. (Repeat the filmstrip if they want to and try the memory test again.)

6. Have a "Greatest Hits" day for kid requests but insist that somewhere in the song or title, an animal's name must be used. Expect favorites such as "Ten Bears in the Bed", "Five Little Speckled Frogs", "Five Little Ducks Went Out to Play"; "How Much is that Doggy in the Window"; etc. An extension of this lesson is the creation of a songbook with lyrics for these tunes so everyone can sing along.

7. Play cuts from Hap Palmer's "Animal Antics". In each song, have the children do something different. Examples: stand up whenever they hear a certain animal's name; play musical instruments on the refrain only; wave their hands like a metronome to the beat; sing along (while reading the words from a song chart); etc.

Physical Education/Guided Activities

1. Spend one period doing animal walks. Start with easy ones like the duckwalk and the crabwalk. Advance to the chicken walk and the elephant walk (hang hands down together to form the swaying trunk.) Let children suggest other animals which have a characteristic walk: walrus walk, giraffe walk, bear walk, camel walk, gorilla walk
   Note: See Teacher Reference section, Physical Education for Children.

2. Spend one period doing locomotor activities of animals that do not walk. Slither like a snake, jump like a kangaroo, hop like a bunny rabbit, swim like a fish, fly like a bird, move like an inchworm, do the crocodile crawl, etc. Again let children suggest other animals and move like them. An extension of this activity is to have animal races.
   Note: See Teacher Reference, Physical Education for Children.

3. Talk about the Animal Olympics. Which is the fastest animal? Which animal would win the swimming race? Which animal would win the broad jump? Which animal is the best at weight-lifting? If animals were the organizers of the Olympic Games, what kinds of contests would they add that we don't have now? (Examples: digging contests or flying contests). How would man do in competition with the animals? Generate a list of questions for library research. (See bibliography for Animal Superstars.)

4. Have an egg-sellent egg day and do these activities: an egg roll (push a real egg with one finger or your nose), an egg toss, (be sure to have clean clothes handy), an egg race (carrying it in a spoon), an egg sit (curl up and balance on your tailbone), an egg roll race in which the children take the egg position and

roll across the room to the finish line. Note: If snack time follows, serve Chinese egg rolls or hard-boiled eggs.

5. Explore the gallop. Depending on the age of the children, you may want to begin with stick horses. Note: use theme music from old Western movies or the "William Tell Overture" (Lone Ranger music). Suggest galloping variations (forward, backward, four on the right foot alternating with four on the left foot, with a partner, in a circle, etc.). Then let children generate possibilities.

6. Play animal games such as "Duck, Duck, Goose" or "Leapfrog". Do variations on old favorites such as "Follow the Leader" or "Simon Says" doing only animal movements.

7. Divide into pairs. Appoint a leader and a follower for each group. Give an animal and a situation. 'Tell the leader to imitate the animal's posture for that situation. Tell the follower to mimic the leader's posture as closely as possible. Examples: a turtle drawn into his shell; a bunny rabbit frozen with fear; a cat with an arched back. Swap roles so that the all students have a chance to be a leader. Continue with: an angry bear, a bucking horse, a tiger about to pounce. Ask for suggestions for other animals from the students.

8. Teach them how to play horseshoes.

Science/Guided Activities

1. Talk about microscopic animals and show pictures or diagrams of some of the more common ones. Show slides on your microscope of these animals. (Note: Slides of dead animals are clear but should be supplemented with slides of live microscopic animals. Pond water is probably the best source of these critters.)

2. Get as many rodents as you can (in separate cages) into your classroom. Divide the class into two teams: similarities and differences. With older children you can teach the terms "compare" and "contrast". Ask them to observe the animals for twenty minutes and to write down (or tell a tape recorder) all the ways they can think of in which the rodents are the same

or different. Post these for the rest of the week and allow others to be added later. Try to summarize why all these animals are classified as rodents. An extension of this lesson is a discussion on why rodents are considered pests.

3. Arrange for a frog and a toad to visit on the same day. Ask the students to draw them or to tell about the likenesses and differences they see.

4. Ask the students if they think human beings are animals. Write the reasons for and against on different ends of the blackboard or on different sheets of posterboard. Play devil's advocate on issues such as "Animals don't talk" by providing additional information (such as whale songs and dolphin language) of which your students may not be aware. Summarize arguments at the end of the period. (See bibliography for The Story of Nim.)

5. If your community has a market which sells live seafood, purchase or "borrow" sea creatures for observation. Shrimp, crayfish, lobster, oyster, catfish, and crab are sometimes available. Discuss the way these animals move, how they defend themselves, their usual habitat, the meaning of "scavenger" or "bottom-dweller", their place in the food chain, etc. An extension of this lesson is a discussion of fresh and saltwater habitats.

6. Make (or fill) birdfeeders for placement outside your classroom windows and around the school. (Hummingbird feeders can be purchased.) Talk about the responsibility we have to take care of other animals and the joy of helping creatures in distress. Discuss the various kinds of birdseed available and the critical time in your area (winter snows, fall migrations, etc.) for feeding birds. (See Appendix A for dimensions, Appendix B for food preferences and the bibliography for a book of plans.)

7. Go on a nature walk around your school, even if your campus is not choc-a-bloc with "wildlife". Ask students to spot habitats (even if it is only a termite nest!) If there are many trees, or if you have woods nearby, talk about the animals that live there. If there are no animals nearby, talk about why the animals have left, how conditions could be changed to entice

them back, what are the advantages of having animals nearby. (Note: provide several books about enticing wild birds by planting certain flowers, supplying water, etc.) Ask the students to choose an area and design how it might look to attract animals, even if it is only a birdbath. Ask them to share their ideas with a school administrator. An extension of this idea is to actually create such an area as a class project.

8. Buy or borrow an incubator and show the class how to set it up. Note: duck eggs, if you can find them, are a better choice than chicken eggs because of their size and the humanitarian question which results from children realizing they are eating possible baby chickens for breakfast. Tend the incubator, giving reasons for your actions until the eggs hatch. Discuss how this process would occur in a natural setting.

9. Ask a parent who fishes to bring a fish and demonstrate how to clean it (scaling, gutting, fileting, etc.) Show the anatomy as he does it.

10. Ask a parent who likes to cook seafood to show how to shuck oysters, peel crabs, shrimp, or crayfish. Discuss the anatomy of these invertebrates.

11. Show pictures of various animals' eyes, or feet, or tongues. Talk about the differences in structure. Explain why having a specialized body part helps in survival. Example: Why do ducks have webbed feet? Introduce the idea of form and function in the natural world. See bibliography, Some Feet Have Noses by Gustafson.)

12. Allow students to check out the birdwatcher's guide (see bibliography) and provide bird-watching sheets for them to record their sightings. This sheet is from Look What I Found! by Marshal Case.

BIRDWATCHER'S LOG

Your Name: Locality:

Date: Weather:

Time: From To a.m. p.m.

Species:	No. of Males	No. of Females

13. Leave a bowl full of eggs on a table, some of which are boiled and some of which are raw. Next to the bowl, leave a note saying, "I know of three different ways to tell if an egg is raw or cooked. Can you figure out how to sort these eggs?" The three ways are listed in Eggventures by Harry Milgrom. 1) Cooked eggs are opaque. Provide a flashlight as a clue. Explain "candling" if they are interested. 2) Spin each egg. Cooked eggs spin faster than raw ones. 3) Fresh raw eggs float in salt water. Provide a measuring cup a teaspoon, and table salt as a clue. Note: Shaking an egg to hear the sloshing sound can be used sometimes but is not particularly accurate. You can let children try it though and then calculate their success rate.

Social Studies/ Guided Activities

1. Read or listen to the story of "The Ugly Duckling" ; discuss the feelings of the duckling. Ask students if they ever have those feelings too. Explore the story carefully; talk about the tendency of animals to notice and ostracize those young who do not conform in appearance and behavior. Do humans ever do this?

2. For younger groups, talk about the characters of Animal and Gonzo on "The Muppet Babies". What is Gonzo anyway? Is Animal really an animal? What about Animal's behavior makes you think of an animal? Does Gonzo ever get teased about his nose? How does he handle it? Have you ever known people who had manners like Animal?

3. Read one of the books listed below and discuss the character's situation and how he resolves it. Stress positive modes of action. Example: What if a Lion Eats Me and I Fall into a Hippopotamus' Mud Hole by Emily Hanlon (about being afraid of new experiences and worrying unnecessarily). A Treeful of Pigs by Arnold Lobel and The Lion Upstairs by Stephen Krensky. Also offer humorous situations for discussion of real problems.

4. Play Kermit's song, "It's Not Easy Being Green". Discuss the children's reactions to the lyrics. Discuss racism and the difficulties of racial minorities. Ask if they have ever wanted to be another color (or freckled). Ask them to close their eyes

and imagine themselves another color, maybe green. What problems would they encounter?

5. Talk about squishing bugs. After the gross comments, ask whether it is right to squish bugs. Does the sort of bug it is make a difference? What about killing other animal? Do the children fish? Do they hunt? Explore the idea of animal rights.

6. Talk about animal trainers, zookeepers, biologists as possible careers. Have the children name as many jobs as they can which deal with animals in a direct way. Which jobs do they think they could do and why? What part of the job would be hard for them? What would the rewards of each of the jobs be? Note: mention animal caretakers in the circus, animal trainers at amusement parks and for motion picture animal stunts, kennel owners, dog obedience schools, pet cemetery owners, handlers and exercisers at race tracks, etc.

7. Talk about Dumbo. Discuss how he turned his exceptionality into an asset. Discuss the role of the mouse as a support person. Discuss the importance of self-confidence in achievement.

8. Which animal would you be? Why? Ask the children to choose an animal that they admire and tell that animal's characteristics. Ask the group to choose an animal for you and to tell you why they choose it. Talk about the legend of Arthur's adventures as various animals. What could being an animal for a while teach us? Show that section from "The Sword in the Stone" if there's time.

9. Talk about animal communities. Stress the roles that different ants or bees play in the survival of the entire colony. Ask students if they can think of human examples of these roles. What people in the community do you depend on? What would happen to our community if these people no longer did their jobs? Do humans have a queen bee? Why not? What other animals can they think of that cooperate besides humans?

Theatre/Guided Activities

1. Pantomime nursery rhymes with animals in them (Example: "Hey, Diddle Diddle") and perform a show for younger children, maybe even preschoolers. Use a minimum of props, makeup and costumes unless you have willing parent volunteers. Encourage voice and posture appropriate for the part. Use extra children to chant the nursery rhymes in effective choral style.

2. Act out well-known animal stories or fairy tales with animals in them. Divide each class into groups; within each group, let each child choose a role from the hat. Examples: "The Three Little Kittens", "The Three Bears", etc. With younger children, this activity can be done in pantomime as you read the book. With older children, let them improvise the lines.

3. Extend the previous activity by allowing the students to change the ending of the story. To get them started, you may have to pose the question which changes the story line. Example: What would have happened if the three little kittens had not washed their mittens, or if the mittens were stained permanently?

4. Create ridiculous scenes between animals. Give the students a situation, their roles, and the first line of the scene. Note: Start with two animals in the scene. As an extension of the activity, add more characters. Examples: Two horses talking before the race; the first horse has won many races and the second has never raced before; the first line is "I'm going to beat you tomorrow."

5. Practice acting out "Chicken Little" informally. If the students enjoy the improvisation, follow up with an informal performance for another class. Note: discuss the effectiveness of the portrayals but always encourage experimentation and risk-taking. Allow children to make suggestions for blocking, business and costumes.

6. Read or show the filmstrip of the Maurice Sendak book, Where the Wild Things Are. Talk about the kinds of animals these wild things were and how they probably moved and sounded. Ask the students to enact the Wild Rumpus part of the story. Note: Music will help motivate some students in this activity.

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If the students enjoy it, also enact Max's leave taking. Take turns letting students be the "wildest thing of all".

7. Present a special report on Walt Disney. Emphasize his creativity, persistence, vision, imagination, and originality. Talk about his accomplishments and show pictures of him (with his creations if possible).

Visual Arts/Guided Activities

1. For second graders, ask the children to choose one thing they ate for lunch and to draw it. Then ask them to draw the food chain of which it is a part. (Having a biologist around during this activity really helps.) Allow the children to change if they cannot draw the food chain for oreo cookies, for example. Having an example of a food chain for reference is advisable. Also provide picture books for commonly needed items such as wheat, corn, etc.

2. For older children or those with advanced fine motor coordination, suggest birdhouse building. Let each student take a different design and follow the instructions independently (if possible). Share products when they are finished and have the builder talk about the problems he encountered and how he solved them. Instructions and pictures for many birdhouses are in How to Have Fun Making Birdhouses and Birdfeeders (See bibliography.)

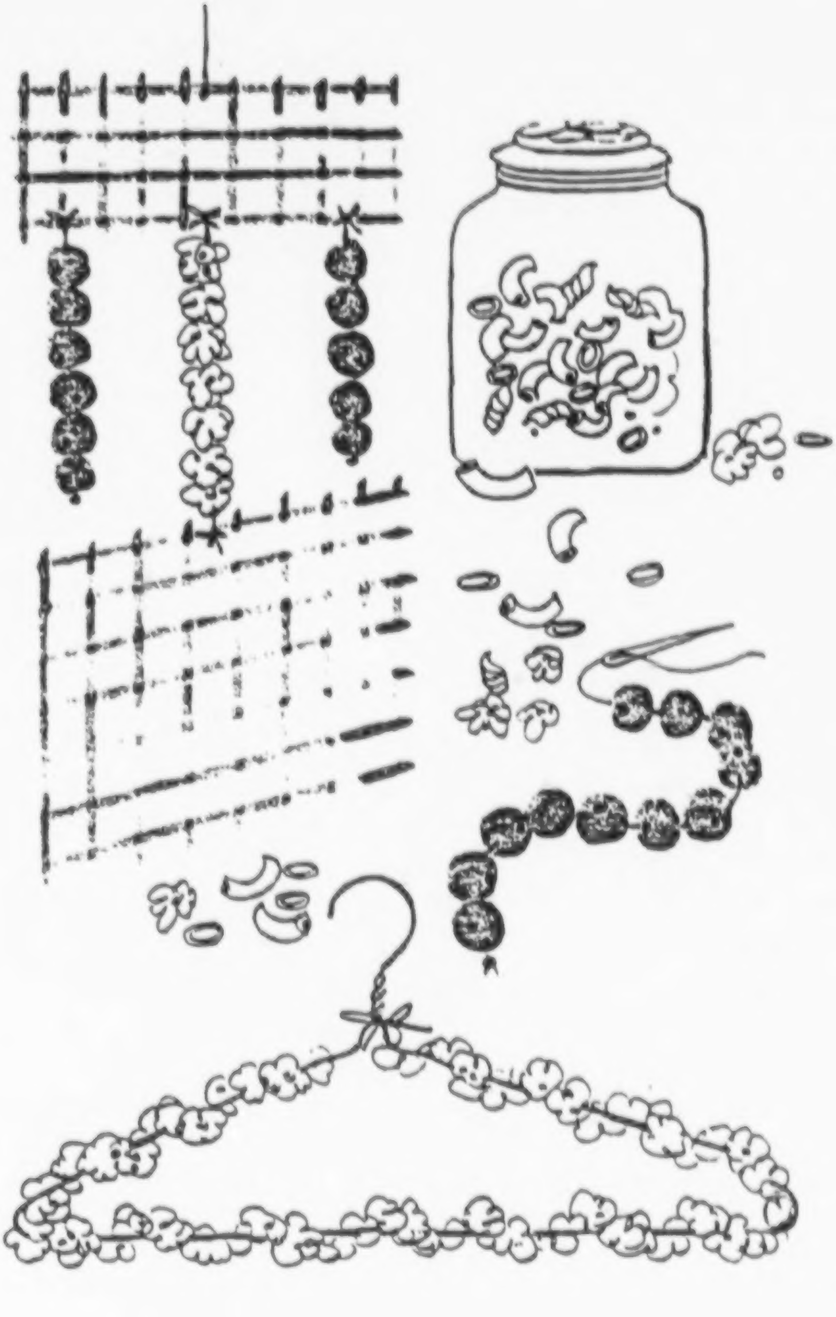
3. Decorate hard-boiled eggs with unusual media--pencils, pens, crayons, chalk, food dye applied with Q-tips, etc. Or teach the children to blow out eggs and decorate the eggs for an egg-tree to be displayed at a nursing home or children's ward at a hospital. Note: eggs from older groups of children can be combined with primary students' eggs for a more impressive egg-tree. This activity is good for interage groups.

4. Set out instructions and materials for making birdfood mobiles. These instructions come from How to Have Fun Making Birdhouses and Birdfeeders. (See bibliography.) Allow children to make their own mobile designs as well.

Mobiles for Birds

Mobiles are fun to make and very easy. So, let's make some mobiles for the birds to eat. You will need one of the plastic boxes that mother gets strawberries or tomatos in from the store. Take the berry box and cut the bottom of the box off. You will also need one of the sides. Now make a string of popcorn. Attach the two pieces of the box together using the string of popcorn. String from the top of the box as many of these as you want. You can even make other strings with cranberries, suet or macaroni for the birds to eat. Hang your mobile from the clothesline or tree branch. You can also use a coat hanger for your mobile. Make strings of popcorn and wrap around the hanger. Then, make other strings with berries and attach to the top part of your hanger. Hang from a tree branch or clothesline.

Source: Creative Educational Society. (1974). How to Have Fun Making Birdhouses and Birdfeeders. Mankato, M.N.: Children's Press.



Source: Creative Educational Society. (1974). How to Have Fun Making Birdhouses and Birdfeeders. Mankato, M.N.: Children's Press.

5. Show a book or magazine with Walt Disney characters and other animal cartoon figures. Have the children generate the names of other cartoon animals they have seen. Talk about the job of the cartoonist and animator. Share Garfield and Snoopy cartoons, etc. If you have an interested group, extend the lesson by showing students how to draw cartoon animals.

6. Show pictures and sculptures by Frederick Remington. Tell about his adventures as a newspaper reporter and illustrator. Discuss the techniques he used to create his very detailed animals and people in motion. Contrast the detail of Remington's work with the simplicity of primitive sculptures or Eskimo carvings. Ask students to say which they like best and why. Try to communicate that both detailed and simple treatments have merit.

7. Demonstrate crayon resist. Ask the students to try it for an underwater scene. Do a brainstorming exercises (all the things under the sea) or guided imagery before they begin to paint. Remind them ofKlee's painting of fish if they want to be too realistic.

8. Show Picasso's bull head made from a bicycle seat and handlebars. Encourage the children to explore "found" art. A zoo of animals can be created with bits and pieces of scrap material. Have a box with a variety of textures, colors and shapes available and encourage children to scrounge too. Display the art if possible.

9. Show a book which illustrates the tracks that animals make in the mud or snow. (See Bob Kaufman's Watch My Tracks in the bibliography). Ask them to copy the tracks. What kind of tracks do humans make. Try footprinting with barefeet. Try making impressions of tennis shoe designs on clay sheets.

10. Discuss animals with stripes, animals with spots; are there animals with plaids? Visualize yourself with spots, with stripes. Show pictures of tropical fish and note horizontal and vertical stripes and dots. Which animals change color to match their surroundings? What if you could change color that way? Draw yourself with different coloration.

11. Demonstrate origami and tell of its origins. Pass out sheets with directions for several simple animals if the children can read. If not, demonstrate and have them follow and fold. Note: the bird that flaps its wings and the frog that hops are favorites. Have books on origami and origami paper available for the children to take home as a follow up activity. (See bibliography for a related story, The Paper Crane.)

12. Talk about and show the work of the fauvists. Stress the wildness of their designs and colors (hence the name, "fauve" which is French for "beast"). Encourage the children to use fluorescent pastels or fluorescent poster paints. Suggest that they take a drab or everyday subject and do a "beastly" painting of it. Suggested works are:

    "La Ciotat" by Othon Frriesz
    "Le Port deL'Estaque" by Georges Braque
    "Le Bassin a Honfleur" by Raoul Dufy
    "Les Ombrelles" by Raoul Dufy
    "La Femme au Chale" by André Derain
    "Die Roten Pferde" by Franz Marc
    "La Desserte Rouge" by Matisse
    "Paysage Aux Arbres Rouges" by Maurice de Vlaminck
    "Le Jardiniere" by Maurice de Vlaminck

    All of these works are contained in The Fauves by Crespelle. (See bibliography.)

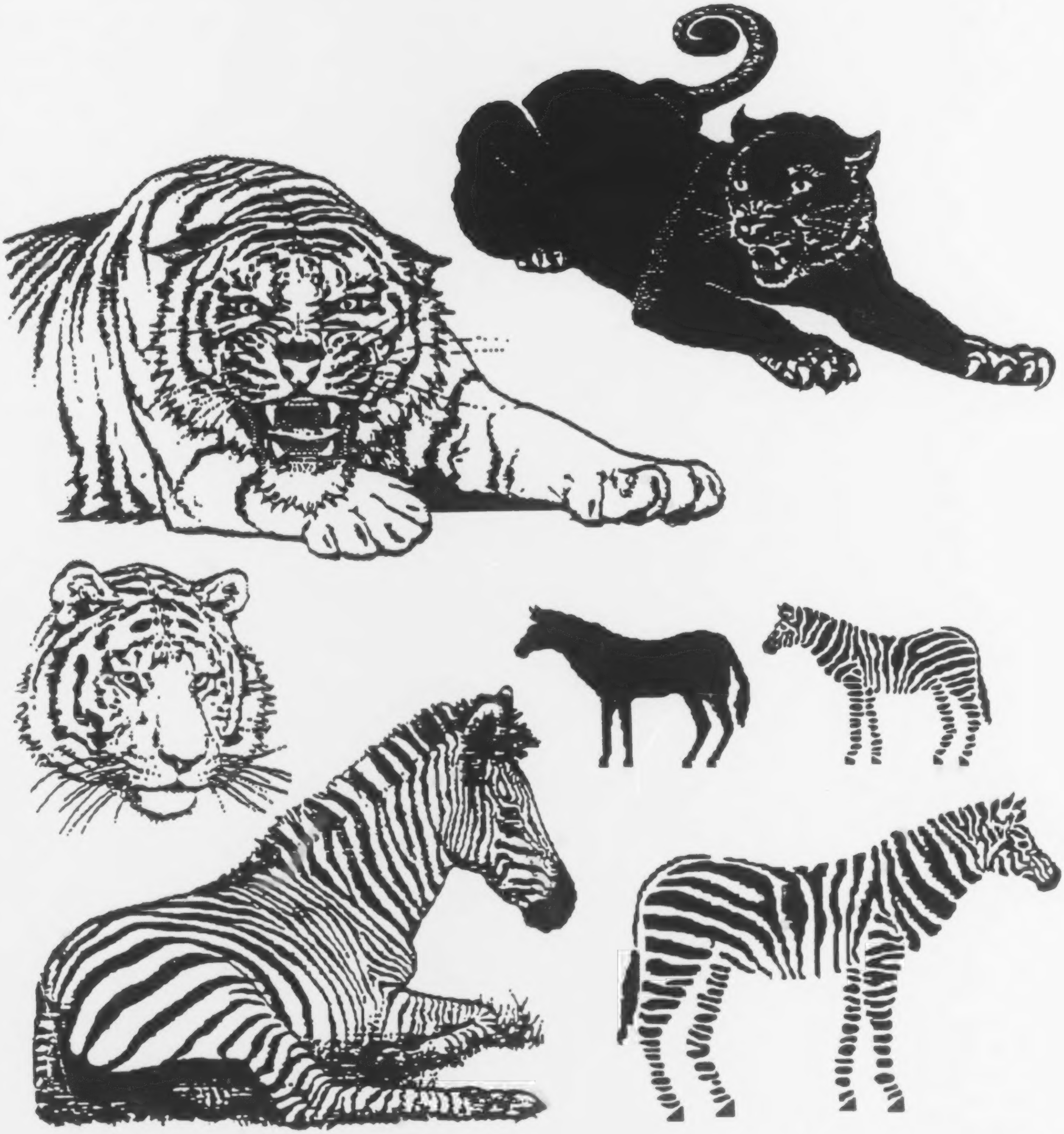
13. What perspective would you have if you were a groundhog? a giraffe? a snake? Explore the idea that the point-of-view of the animal affects what he sees and how he sees it? Discuss the size of a child's foot to an ant...to an elephant. Ask them to imagine that 1) they are an ant climbing up the side of their shoe; 2) a giraffe looking down at a mouse on the ground; 3) a snake coming out of a hole in the ground and seeing a mouse scurrying away. Ask them to draw or paint from the perspective of an animal. Encourage them to try different angles of observation. They may want to stand on a table to look down or lie on the floor to look up. (Show Ballon Trip by Ron Wegen for an excellent example of multiple perspectives.)

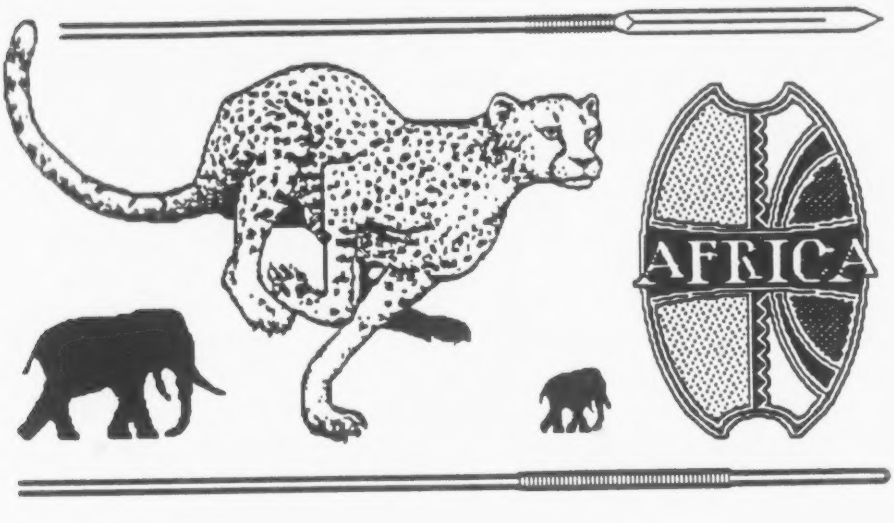
Free and Inexpensive Teaching Resources

Bibliography of Materials for Environmental Education. Wisconsin Vocational Studies Center, University of Wisconsin, 1025 W. Johnson St., Madison, WI 53706

NWF Conservation Education Catalog. National Wildlife Federation, 1412 Sixteenth St., NW, Washington, D.C. 20036.

Free and Inexpensive Materials in Environmental Science and Related Disciplines. Ann Hope Ruzow. Vance Bibliographies, P.O. Box 229, Monticello, IL 61856.

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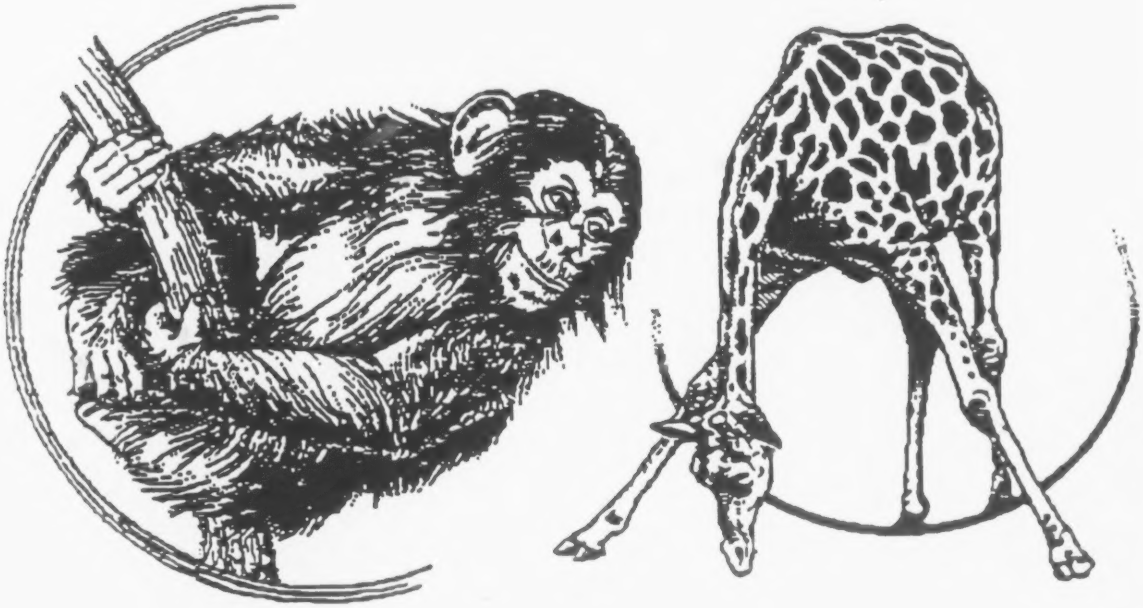

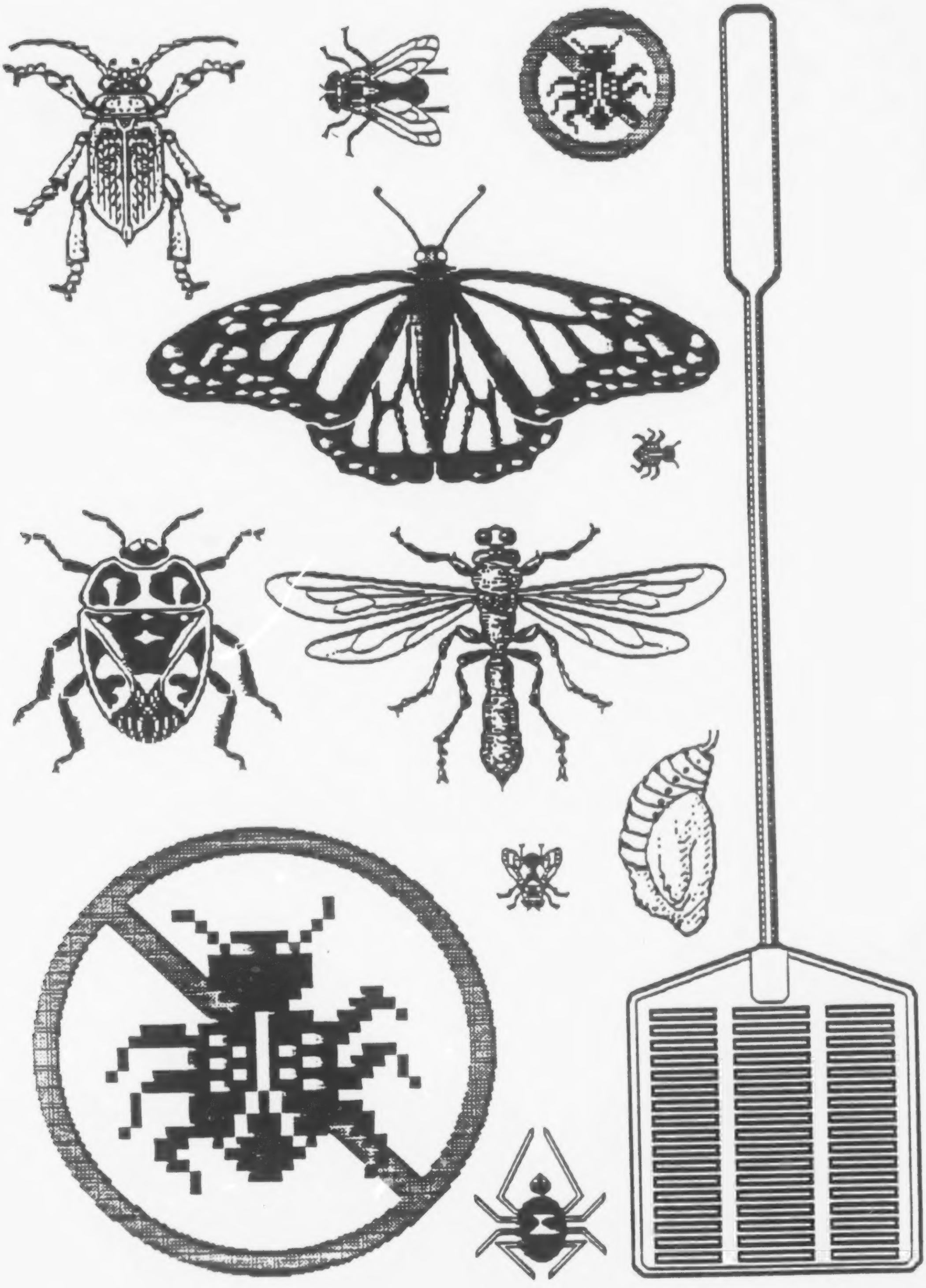

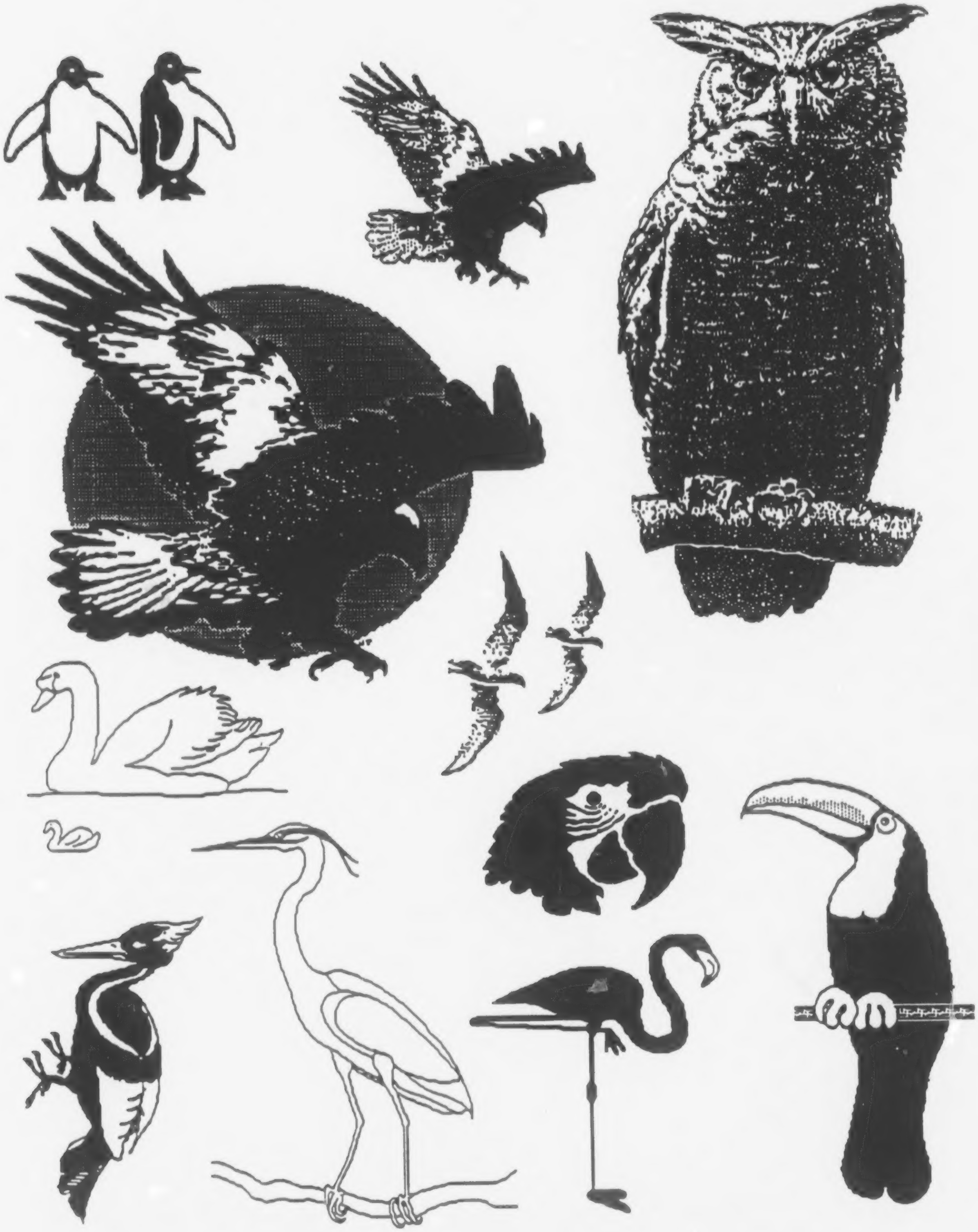

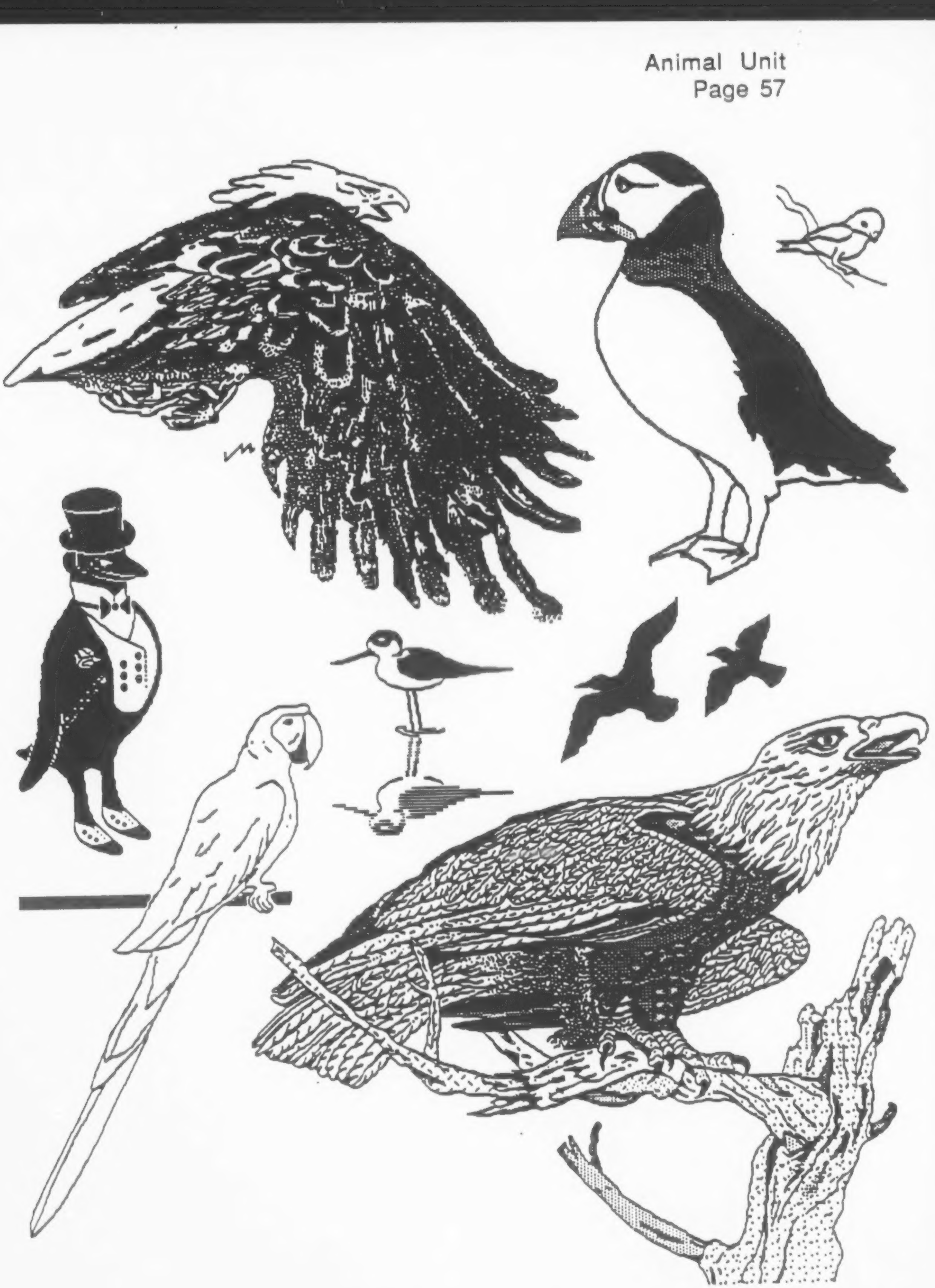

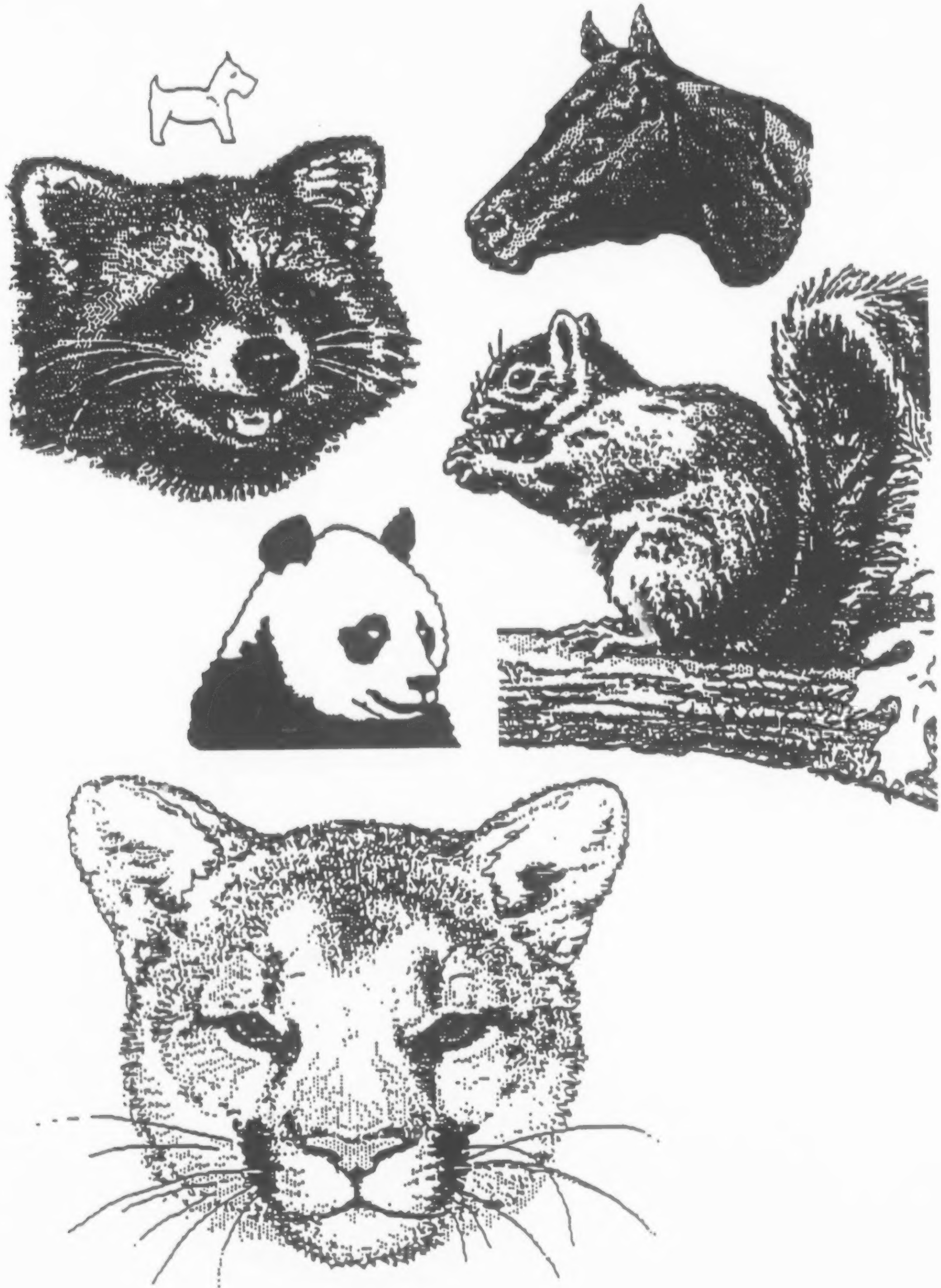

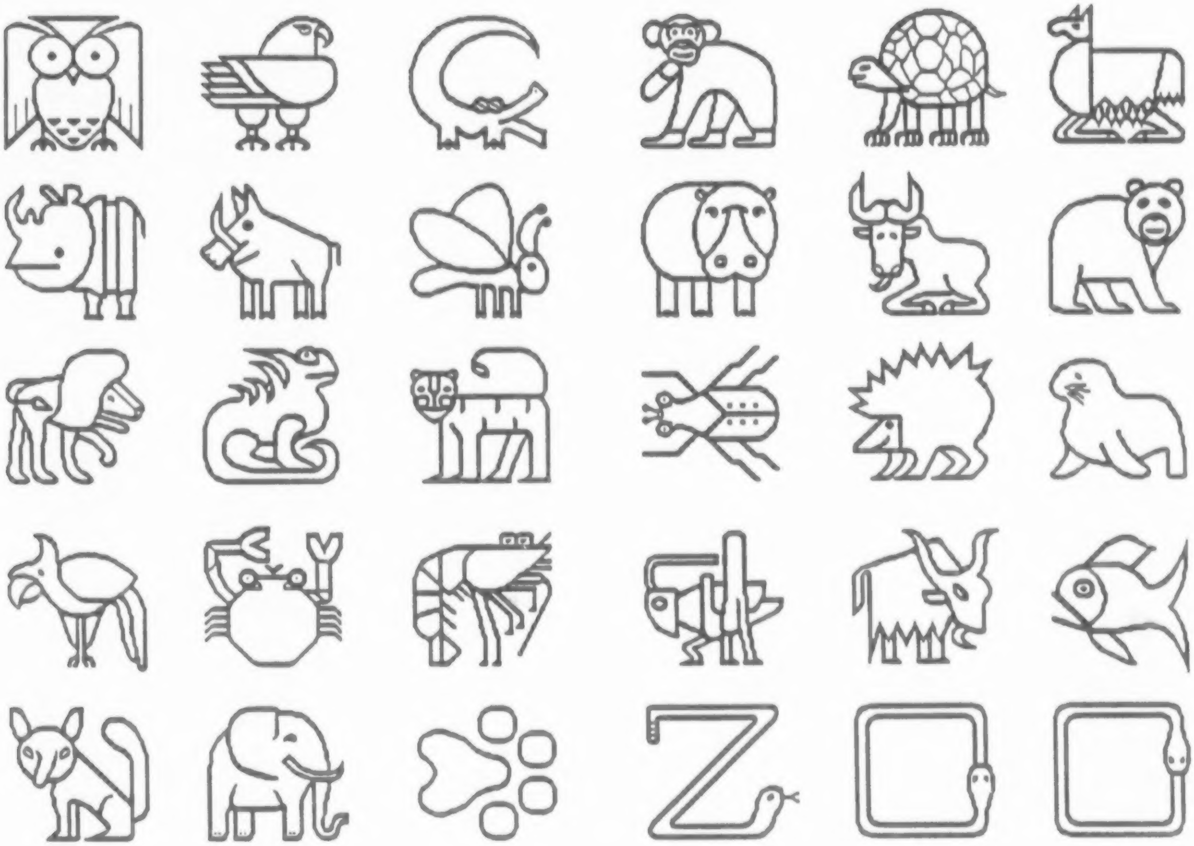

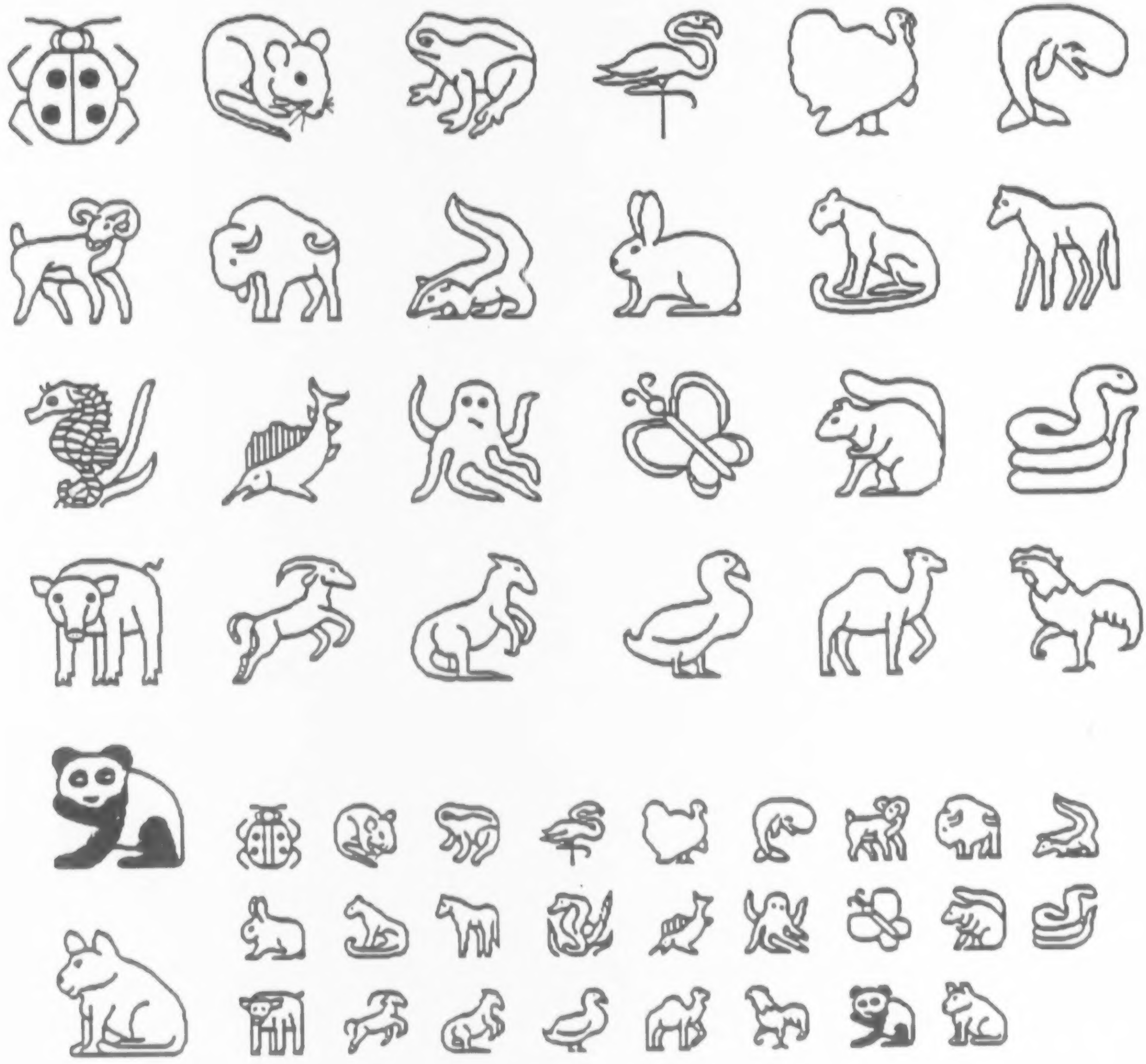

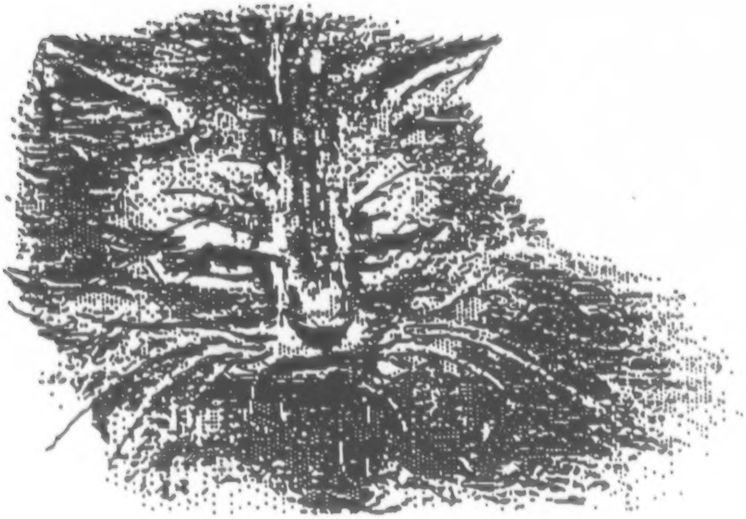

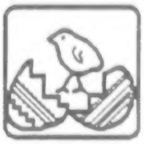

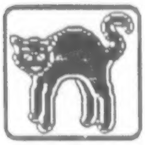

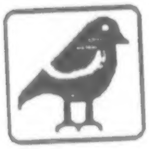

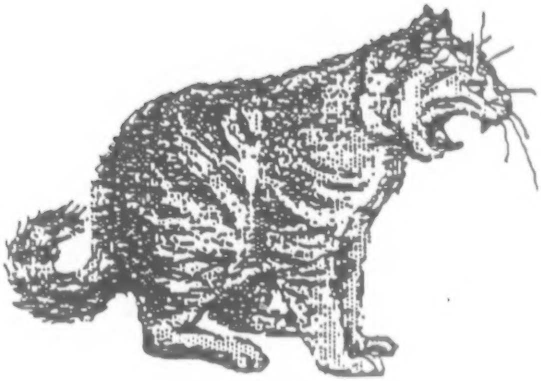

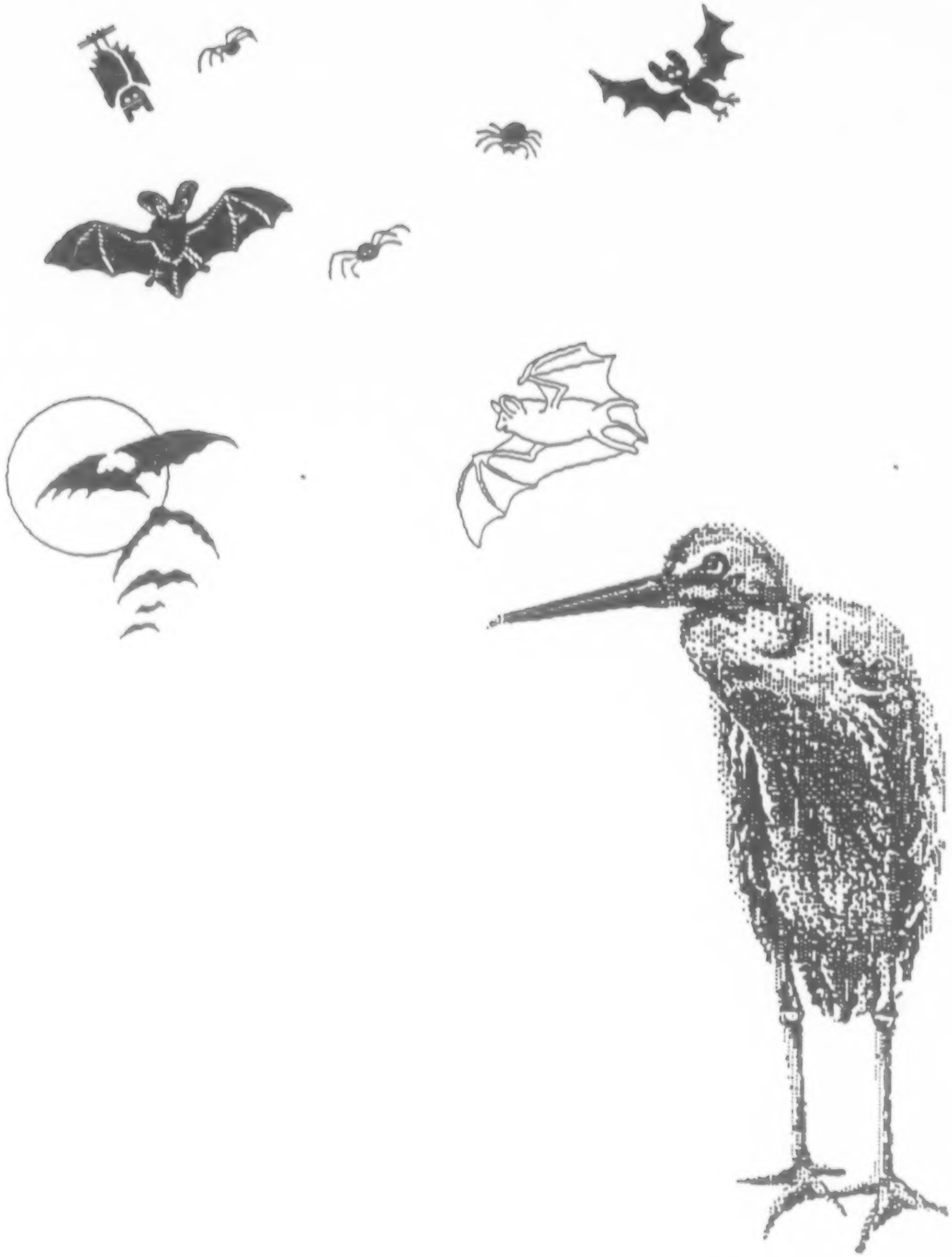

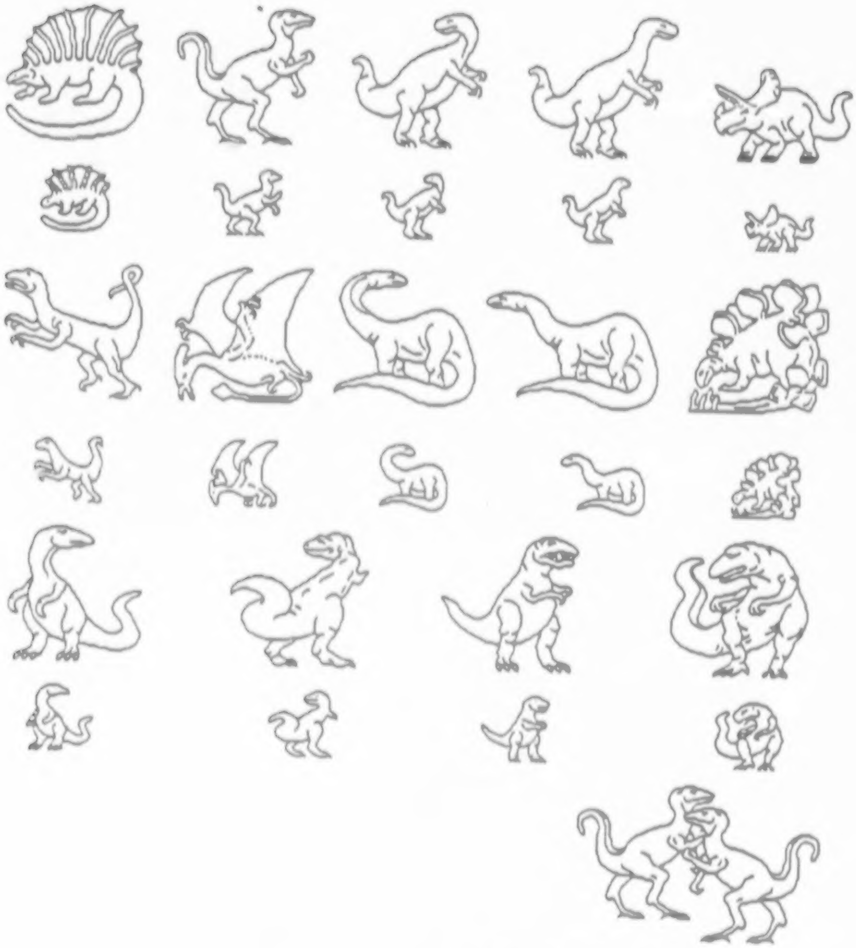

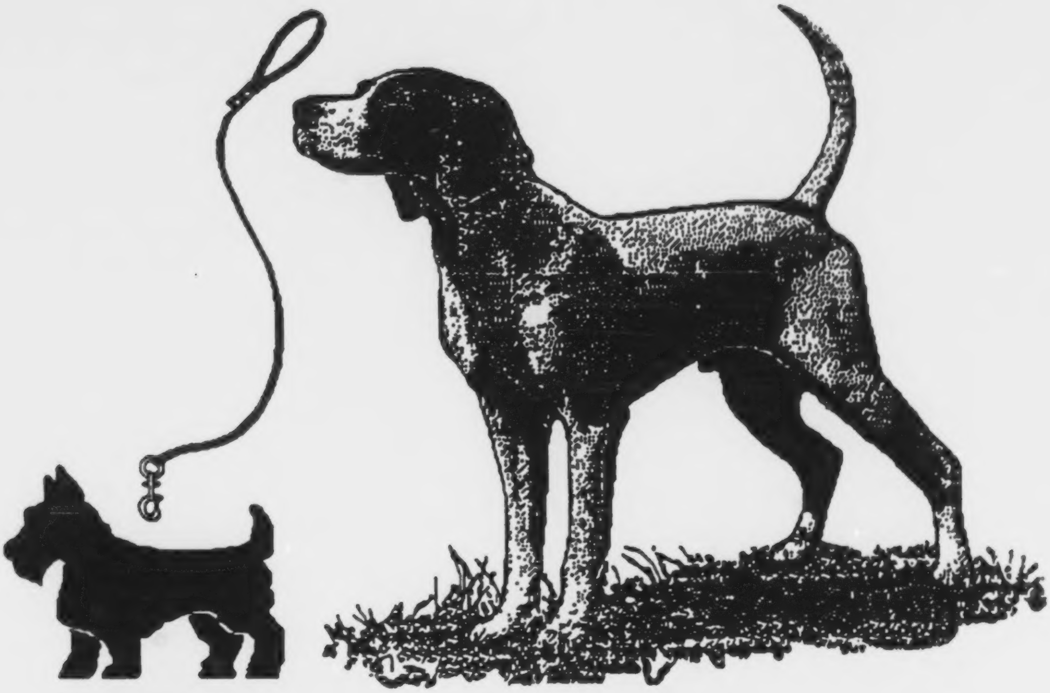

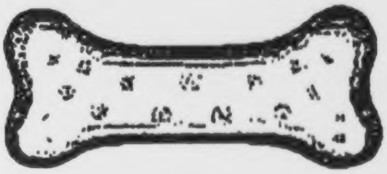

Fido
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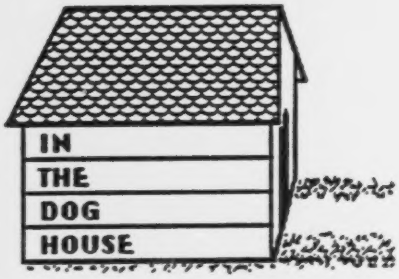
Doggone Good...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DOG
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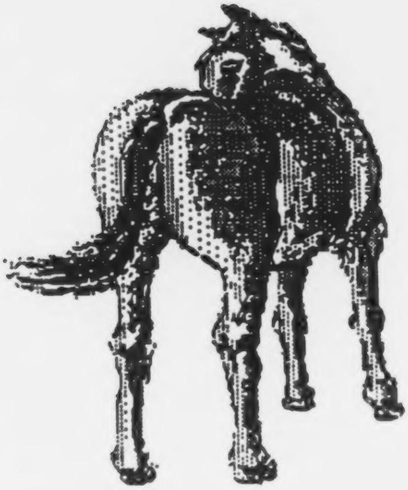

Questions and Topics for Independent Study

Questions

1. Is a dolphin a fish or a mammal? Why?
2. What animals live in a desert?
3. What is unusual about lemmings?
4. How can you tell a poisonous snake from a non-poisonous snake?
5. Do raccoons make good pets?
6. What is a marmot?
7. Why are teddy bears named Teddy?
8. How can you tell an alligator from a crocodile?
9. Is a bumblebee different from a honeybee?
10. Explain how crickets and grasshoppers are different.
11. What are exotic animals? What are domestic animals?

Topics

John James Audubon
Jane Goodall
Jacques Cousteau
The Sacred Cow
The Great Auk (or other extinct animals except dinosaurs)
Unusual Animals (Examples: platypus, echidna, hyrax)
Endangered Animals (Examples: bison, brown pelican, panda, manatee)
Rabies
Gargoyles
Chameleons
Boa Constrictors
Primates

Closure Activities

1. Take a trip to a zoo. Make observations and record them.
2. Ask each child to read several sources about his/her favorite animal. Choose a day or two to share information and sources in a seminar like session.
3. Ask each child to write a report on an animal to be compiled into a document for the school library. (If parent volunteers are available, ask them to prepare the manuscript on a word processor. Bind it if feasible.)

Unit Evaluation

1. Achievement of short term objectives regarding participation and products.
2. Participation in or performance of responsibilities for the zoo trip and observations.
3. Completion of culminating product or performance (individual or group) requiring synthesis of major concepts taught.
4. Adequate score on a teacher made test .
5. Successful interview of student (oral or written) about his learning performance.
6. Satisfactory ratings on skills checklists designed for the subject area.

Vocabulary

alligator
amphibian
analogy
anatomy
animal
animal shelter
animal trainer
animator
antenna
antler
aquarium
aquatic
armadillo
attack
attribute
baboon
bait
bark
bay
beak
beast
beaver
behavior
bill
biologist
bird
bird feeder
birdbath
birdwatcher
bison
boa constrictor
bovine
bray
buffalo
bumblebee
burrow
calf
canine
carnivore
cartoon
centaur
characteristic
chart
cheetah
chick
chimera
chipmunk
chirp
choral reading
classify
claw
cluck
cocoon
colony
colt
communicate
compare
conservation
contrast
coo
critter
crocodile
crocodile
cub
defend
den
diary
diet
different
diurnal
dolphin
donkey
duckling
earthworm
egg
elk
endangered
environment
equine
evolution
exotic
extinct
fable
fang
farm
fawn
feather
feline
ferret
fin
fish
flock
food chain
food web
form
found art
function
fur
gaggle
gallop
gargoyle
genus
gerbil
gila moster
gill
giraffe
gorilla
gosling
gryphon
guinea pig
habitat
hatch
hawk
herbivore
herd
herpetologist
hibernation
hide
hiss
honeycomb
honk
hoof
horn
humane
hump
ichthyologist
iguana
improvise
insect
interdependence
interview
jaguar
kangaroo
kennel
kid
kit
lama
lamb
lark
leopard
life cycle
lion
livestock
locomotion
locust
lungs
mammal
mane
mare
marine
marmot
maze
memic
mermaid
metamorphosis
mew
microscopic
migrate
migration
milk

molt
monkey
moose
mud dauber
mule
muskrat
natural enemies
nest
nocturnal
observe
omnivore
onomatopoiea
opossum
origami
ornithologist
ostrich
pantomime
pest
pet
pig
platypus
pod
point-of-view
polliwog
pounce
predator
preservation
preserve
prey
pride
primate
protective coloration
quack
quail
raccoon
ranch
record
reference book
reproduce
reproduction
reptile
responsible
rodent
rookery
salamander
scale
scavenger
school
seashell
shear
shed
shell
similar
simile
skin
sort
species
spider
spine
spots
squirrel
stalk
stripes
survival
survive
swarm
tadpole
tail
tale
tame
taxidermist
tentacle
terrarium
texture
theme
tiger
tortoise
tracks
trumpet
trunk
turkey
turtle
unicorn
vegetarian
veterinarian
vivarium
vulture
wallaby
whale
whinny
wild
wildlife
wing
wolf
yak
yelp
yowl
zebra
zoologist

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Animal Unit
Appendix A

BIRD HOUSE DIMENSION CHART

	Floor of cavity	Depth of cavity	Entrance above floor	Diameter of entrance	Height above ground
	Inches	Inches	Inches	Inches	Feet
Bluebird	5 x 5	8	6	1 1/2	5-10
Robin	6 x 8	8	(3 sides open)		6-15
Chickadee	4 x 4	8-10	6-8	1 1/8	6-15
Titmouse	4 x 4	8-10	6-8	1 1/4	6-15
Nuthatch	4 x 4	8-10	6-8	1 1/4	12-20
House Wren	4 x 4	6-8	1-6	1	6-10
Tree Swallow	5 x 5	6	1-5	1 1/2	10-15
Purple Martin	6 x 6	6	1	2 1/2	15-20
Crested Flycatcher	6 x 6	8-10	6-8	2	8-20
Flicker	7 x 7	16-18	14-16	2 1/2	6-20
Downy Woodpecker	4 x 4	8-10	6-8	1 1/4	6-20
Screech Owl	8 x 8	12-15	9-12	3	10-30
Sparrow Hawk	8 x 8	12-15	9-12	3	10-30
Wood Duck	10 x 18	10-24	12-16	4	10-30

Source: Creative Educational Society. (1974). How to Have Fun Making Birdhouses and Birdfeeders. Mankato, M.N.: Children's Press.

Animal Unit
Appendix B

BIRDS	FEEDERS & FOODS
American Goldfinch and Pine Siskin	Prefer hanging feeders. Canary seed, nutmeats, sunflower seed, thistle seeds.*
American Robin	Prefers ground feeders. Cheese currants, any chopped fruits, raisins*
Bluebirds	Use most feeders. Cheese, chopped unsalted peanuts, currants, fine cracked corn, raisins, small berries,* suet.
Chickadees and Titmice	Prefer hanging feeders. Canary seed, nutmeats, pumpkin seeds, suet, sunflower seeds,* raw peanuts.
House Finch millet, nutmeats, suet,	Uses most feeders. Canary seed, cut fruits, sunflower seeds,* thistle seeds.
Hummingbirds	Use hummingbird feeders (wash frequently). Boiled sugar-water solution of one part sugar to four parts water.
Jays: Blue, Scrub, and Steller's	Prefer ground feeders. Fine cracked corn, nutmeats, raisins, suet, sunflower seed,* unshelled raw peanuts.*
Northern Cardinal	Uses most feeders. Barley, fine cracked corn, millet, nutmeats, suet, sunflower seeds,* unsalted peanuts.
Woodpeckers	Prefer tree-trunk feeders. Cheese, cut fruits, meat scraps, nutmeats, suet.*

*Preferred foods.

Source: Rinard, J.E. (1985). Helping Our Animal Friends. Washington D.C.: National Geographic Society.

MEASUREMENT UNIT

MEASUREMENT UNIT

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MEASUREMENT UNIT

Background Information

This unit on measurement explores many topics -- how and why we measure things, why estimation is a necessary skill, what precision is. But perhaps the most important concept of the unit is balance. The students will explore its many definitions and apply it to many subject areas. Perhaps the best explanation of some of the aspects of balance which might be studied in this unit are described in this excerpt from Composition in Landscape and Still Life by Ernest Watson.

> Balance is a fundamental law of the universe: All else is predicated upon it, both in nature and in the affairs of man. Growing trees put out their branches from the trunk in the most advantageous way to achieve stability. As for man, ever since learning in babyhood to balance his body on his feet, he has become progressively sensitive to it, so much so that the *appearance* of balance is almost as essential to his comfort as is physical balance itself. To a highly trained artist and designer it *is* essential. Visiting in the home of a prominent sculptor, I witnessed an impressive example of this super-sensitiveness. As we sat talking, a six-year-old grandson passed through the room and bumped against a low cabinet, toppling a small sculpture on it. He replaced it carelessly. When the child had gone by, my friend got up and without interrupting the flow of conversation set the piece in what obviously was its studied place among other objects.
>
> Sensitivity to esthetic, visual balance is not so unusual. Practically everyone has it in some degree. Even the most unsophisticated housewife will place objects on the mantle-shelf in a balanced arrangement, disposing the candlesticks at equal distance from the clock in the center, or arranging a group of objects in dead center to satisfy her intuitive feeling for visual balance. But the average person's sense of balance, both physical and esthetic, remains rudimentary and uncultured unless persistently developed through study and exercise. The spectacular performances of

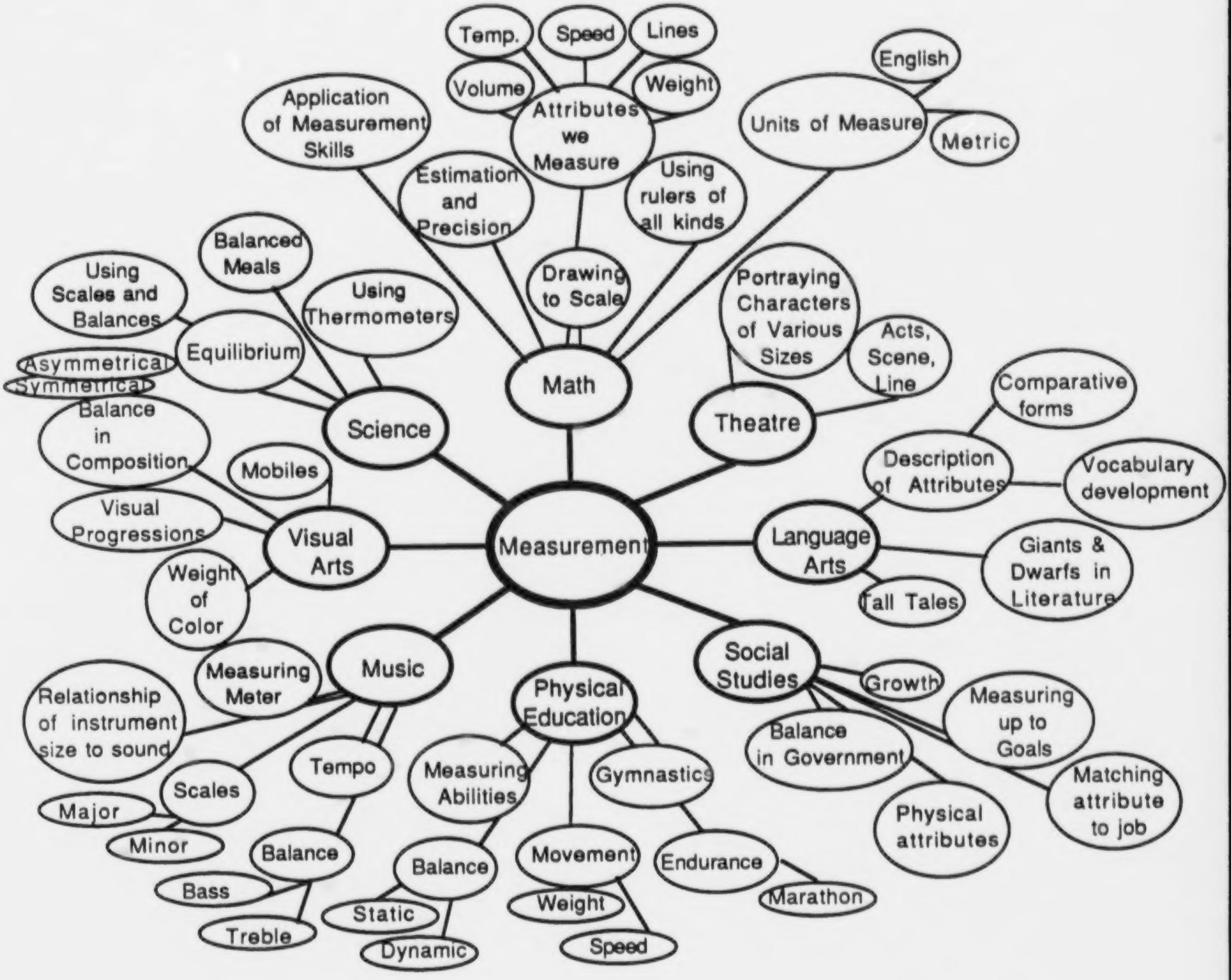
> professional acrobats make us aware of the tremendous physical gulf between trained and untrained muscular coordination. In the realm of esthetic balance the disparity between the artist's sensitivity and that of the layman is fully as great.
>
> Symmetrical balance is elementary but only through much study can one achieve any appreciable degree of sensitivity to asymmetrical balance; and almost every move in picture-making involves that kind of balance."

In addition to helping the students know and use the many definitions of "balance", this unit also stresses the many applications of the word "scale". As in each of these units, the students are encouraged to think in inter-disciplinary and multi-disciplinary ways and to apply concepts to many diverse subject areas.

Likewise, the teacher will be expected to apply the lessons of this unit to her teaching, becoming more sensitive to the balance of her pedagozical activities (subjects covered - style of learning used - convergent vs. divergent activities) and to scale in the classroom (the formal and informal measures by which she evaluates her students). The teacher may also be made more aware of aesthetic considerations in the classroom environment such as balance in the arrangement of visual displays and the scale of furniture and equipment to the size of her students.

Measurement in its strictest mathematical sense will not adequately describe the contents of these activities; however it serves as an adequate starting point for the study of units, progressions, and stability.

Visual Orgainization of Topics


Measurement
Math
Application of Measurement Skills
Estimation and Precision
Attributes we Measure
Temp.
Speed
Lines
Volume
Weight
Using rulers of all kinds
Drawing to Scale
Units of Measure
English
Metric
Theatre
Portraying Characters of Various Sizes
Acts, Scene, Line
Language Arts
Description of Attributes
Comparative forms
Vocabulary development
Giants & Dwarfs in Literature
Tall Tales
Social Studies
Growth
Measuring up to Goals
Matching attribute to job
Physical attributes
Balance in Government
Physical Education
Gymnastics
Endurance
Marathon
Movement
Weight
Speed
Measuring Abilities
Balance
Static
Dynamic
Music
Measuring Meter
Relationship of instrument size to sound
Scales
Major
Minor
Tempo
Balance
Bass
Treble
Visual Arts
Balance in Composition
Mobiles
Visual Progressions
Weight of Color
Science
Balanced Meals
Using Thermometers
Equilibrium
Using Scales and Balances
Asymmetrical
Symmetrical

Short Term Objectives

Language Arts

1. The student will increase his reading vocabulary by 50 words.

2. The student will complete at least one creative writing assignment.

3. The student will participate effectively in at least 2 discussions.

4. The student will recognize homonyms, antonyms and synonyms in the vocabulary list.

5. The student will use comparative forms correctly.

6. The student will recognize compound words.

7. The student will listen attentively to guest speakers and classmates 80% of the time.

8. The student will read or listen to two stories about giants, dwarves or people changing sizes.

9. The student will accurately describe the size and weight of objects or people.

Mathematics

1. The student will compare objects and show smaller, larger, and same size.

2. The student will order objects by size.

3. The student will determine which line is longer, shorter, long enough.

4. The student will compare objects as to longer/shorter, longest/shortest by the use of nonstandard units to identify the need for standard units.

5. The student will use a variety of measuring tools and tell why or how each is used.

6. The student will compare lengths by the use of English Units, (inches, feet, yards, miles).

7. The student will compare lengths by the use of Metric Units, (centimeters, meters and kilometers).

8. The student will draw line segments a given length in inches.

9. The student will measure a distance in feet.

10. The student will draw a line segment a given number of centimeters.

11. The student will recognize scaled drawings or plans.

12. The student will measure objects using yards and meters as units.

13. The student will, using arbitrary units, tell which object is farther or closer.

14. The student will tell which temperature is warmer or colder.

15. The student will show and tell what a thermometer does.

16. The student will interpret degrees in Fahrenheit.

17. The student will interpret degrees in Celsius.

18. The student will tell which speed is faster or slower

19. The student will compare objects by weight on a balance scale.

20. The student will tell which container holds more.

21. The student will compare liquid quantities as to more/less.

22. The student will identify how many pints can be filled by a given number of cups.

23. The student will identify how many quarts can be filled by a given number of cups.

24. The student will measure liquid using liters.

25. The student will identify units of liquid measure (cup, pint, quart, gallon).

26. The student will list physical attributes we can measure.

27. The student will determine the best unit of measurement to use in different instances.

28. The student will categorize units of measure for temperature, length, volume, weight or speed.

29. The student will compare different units of measures of length and volume.

30. The student will express one measure in terms of another. (Example: one foot = 12 inches.)

31. The student will complete tables of equivalency for various measures.
    Example: 1 gallon = 4 quarts
    2 gallons = ___ quarts
    3 gallons = ___ quarts

32. The student will apply measurement skills to cooking and other classroom activities.

33. The student will explain or give examples of estimation and precision.

Music

1. The student will recognize scales, either major or minor.

2. The student will distinguish between bass and treble sounds in recorded music or on an instrument.

3. The student will play with or explore freely the makeshift instruments (or real instruments) provided.

4. The student will sing or play songs of his own choosing or songs of his own composition.

5. The student will give examples of the relationship between the size and sound of an instruement.

6. The student will define tempo and give examples of fast and slow songs.

7. The student will identify one measure on a sheet of music and tell what a measure is.

Physical Education (Dance)

1. The student will correctly perform these movements on a balance beam without falling: walking forward; walking backward; walking on tiptoe; walking heel/toe.

2. The student will exhibit at least 10% improvement on tests of static and dynamic balance.

3. The student will participate in daily practices of balance - improving activities such as the balance board, balance wheel, balance beam, etc.

4. The student will move expressively to musical accompaniment, showing variations in the quality and speed of his movements.

5. The student will participate in group games 80% of the time.

6. The student will explain the terms "endurance", "marathon" and "gymnastics".

Science

1. The student will use the words in the general vocabulary list correctly 80% of the time.

2. The student will use rulers, thermometers, measuring cups and measuring spoons correctly.

3. The student will use scales and balances correctly.

4. The student will demonstrate or tell the difference between weight and mass.

5. The student will define temperature and give an example.

6. The student will explain (or show using an object) the meaning of length, width and height.

7. The student will list several kinds of liquid measure (cups, pints, quarts, gallons, liters, etc.).

8. The student will define "equilibrium" and tell how humans and/or animals keep their balance.

9. The student will define "balanced meal" and will describe a meal which is balanced nutritionally.

Theatre

1. The student will convincingly portray characters of varying sizes and weights (dwarfs, giants, etc.).

2. The student will role play or pantomime in at least 2 creative dramatics situations.

3. The student will move in character in at least one activity.

4. The student will explain the division of theatrical works into acts, and scenes.

5. The student will define "intermission".

Visual Arts

1. The student will correctly identify a mobile.

2. The student will be able to differentiate between symmetrical and asymmetrical balance in a painting.

3. The student will use 70% of the following new words correctly in an artistic context: balance, symmetrical, asymmetrical, mobile, weight, design, composition.

4. The student will recognize work by one of these artists: Mondrian, Matisse, Calder.

5. The student will explore various media while practicing balance in composition (tempera or poster paint, various papers, inks).

6. The student will explore the effect of paper or canvas size on his art work.

7. The student will produce at least one work without a sketch and one work with a sketch. (3-d mobile or 2-d painting or collage).

8. The student will demonstrate aesthetic concern for balance in his environment and his artistic work.

9. The student will relate the concept of physical balance to the concept of aesthetic or artistic balance and understand the human need for each.

10. The student will participate in the discussion of problem-solving in art and in the evaluation of art not produced in class.

11. The student will explain balance in visual composition.

12. The student will produce a balanced work given several design elements.

13. The student will identify "light" colors and "heavy" ones.

Field Trip Ideas

1. Visit a gymnastics class or a gymnastics lab to see a demonstration of various kinds of gymnastics routines. Talk to the coach and the athletes about the importance of balance and how they develop balance through exercise.

2. Visit a veterinary anatomy laboratory or a biology laboratory and talk about the cerebellum (the part of the brain mainly concerned with equilibrium and balance). If possible see models or real brain specimens from various animals. Note: The cerebellum of animals which need great balance, for example the opossum, is very large while the cerebellum for other animals, for example dogs, is not so large. See if the children can discover this relationship of form to function.

3. Visit any laboratory or a series of laboratories and have the researchers show the students how they measure various characteristics or qualities of substances. Examples: measuring the intensity of light; measuring the frequency of sound; measuring the amount of chemical in a sample.

4. Go on an extended field trip to see how many kinds of scales are in your community. See a grocery or market with produce scales; a truckstop with truck scales; a veterinarian's office or livestock auction with scales for large animals; a feed store with large scales,; a fishmarket with hand-held scales for weighing the seafood; a pharmacy with a demonstration of the exact measurements needed for mixing drugs.

5. Visit a symphony rehearsal or an orchestra class or a percussion laboratory. Help children relate the size of the instruments to the size and quality of the sound they produce. If possible have various horns play the scales so the children can hear the timbre differences and ranges of the various instruments.

6. Visit a recording studio. Learn about channels and levels in recording music. Ask for a demonstration of equalizers and other equipment which balances sound.

Speaker Ideas

1. Invite a surveyor to tell what he does and why his job is important. Ask him to demonstrate his equipment and explain why surveyors are seen near building sites for roads, bridges, etc. If possible, explain the use of lasers in surveying.

2. Invite a home economics teacher to measure some of the children and to display patterns used for sewing. If possible, have her draw patterns or cut cloth for the smallest and largest children in the room. Ask her to discuss the importance of both estimation and precision in sewing.

3. Ask any of the following people to talk about the importance of blueprints and plans: carpenter, welder, bricklayer, plumber. Ask them to share mistakes they have made in measuring; ask them to show the children plans and blueprints. Look at the plans and blueprints for your school if they are available.

4. Invite a nutritionist (possibly from the school district or a local hospital or nursing home) to talk about how she plans meals so that everyone gets a balanced diet. Ask her to bring posters or charts to show visually how she does her job. Hand out menu-records during or after her visit and ask children to write down everything they eat for 24 hours or a three-day period (for older students) . Discuss whether these records show a balanced diet.

5. Invite someone whose hobby requires balance--a juggler, an acrobat, a unicycle rider, etc. Ask him to stress the amount of practice needed to become proficient at his hobby.

Bulletin Board Ideas

"Scales and More Scales"

Give a team of students a mixed up bulletin board or the pieces of a bulletin board which they must then arrange and put up. The labels should include: a musical scale, the scales of justice, scale a wall, fish scales, bathroom scales, and a scale on a map. Include a picture of each of these to be matched to these labels. Xeroxes of encyclopedia entries or enlargements of the illustrations in some dictionaries will serve this purpose well.

Region VII E.S.C.
McCallister

"Trivia"

Fill the bulletin board with trivia questions about the size or weight of various objects. Note: Be sure the answers to these questions can be found in reference books available in your classroom such as almanacs, the Guinness Book of World Records, etc. Examples of such questions are: What is the largest tomato ever grown? How long is the Queen Elizabeth II? If their natural curiosity doesn't motivate them, have a team race on Friday to answer all the questions on the bulletin board.

"Mrs. _________'s Class and their Balancing Act"

Take Polaroid pictures of feats of balance accomplished by the children during the unit. Some examples are: the winner of the contest for stacking block towers; the participants in the finals of the TWISTER contest; the person who could balance the most bean bags on his head; the team which improved the most on balance exercises in p.e.; the winner of the "Mother, May I" contest, etc.

"Make Your Own Bulletin Board, Class!"

Ask for a group of volunteers to create a bulletin board on balance. Provide old magazines from which they can choose illustrations. Suggestions might include . . . occupations which require balance; examples of balance in photographs; pictures of gymnasts or acrobats in performance; bookjackets from biographies of circus performers or athletes with legendary balance; a definition (or many definitions) of the word "balance". Be sure that when the students put the bulletin board materials up, they have balanced the text and illustrations.

Snack Suggestions

1. Ask the students how many ounces of jello or pudding they want for snack. Measure the amount on a food scale before serving.

2. Make a very long sandwich on french bread. If you like, students can measure the bread and estimate how many pieces of bologna or cheese or slices of tomato will be needed to cover its length. When the sandwich is finished, ask each student to estimate how much they will want and then have them measure it correctly before you cut their piece. For older children do not allow whole inch pieces; have them request and measure amounts with fractions.

3. Measure juice one day in ounces; allow students to request the number of ounces they want. The next day serve juice after they have requested an amount in milliliters.

4. Display milk containers of various sorts: half-pint, pint, quart, half-gallon and gallon. Pour milk into three-ounce or five-ounce paper cups from these containers. How many children can I serve from the half-pint? How many cups can I fill from the pint? etc.

5. Choose one week of the unit when children can cook their snack each day. Post directions for the snack on a large flip-chart and allow each child to make his own or choose teams to cook for each day of the week. Remember that children have to eat their mistakes in order to encourage them to be precise in their measurement.

6. Use the metric recipes on pages 16-18 for snacks or a shared lunch. Talk about the metric system as you cook. The source for the recipes is Eva-Lee Baird and Rose Wyler's book Going Metric the Fun Way.

7. Discuss pizza size. Display the prices and sizes from various pizza establishments that deliver. Estimate the size you will need for the class to all have one piece. Discuss diameter and the fraction of the pizza each will receive. Order pizza and see if the students were right in the size they chose.

8. Discuss the concept of a "balanced meal" and then put out snacks from the four food groups. Insist that the students balance their snack by choosing one from each of the four food groups (but do not label the foods or the food groups). Simply tell them "yes" or "no" until they have foods from the four food groups. Discuss their choices and the combinations as you eat. Examples of snacks from which to choose: peanut butter, carrot sticks, raisins, crackers, bread, celery sticks, soft cheese, sausage, butter, apple slices.

9. Make fruit salad. (Let the children help if possible.) "Sell" it to the students by the ounce and let them pay in play money.

10. Tell the children that you will give them a stack of cookies but that they must tell you how tall the stack is. If their answer is correct, they can keep the cookie stack. If not, they have to wait for another turn.

11. Tell the children to estimate how long a line of pretzel sticks is.. The child with the closest estimation gets all the pretzel sticks. (Use pretzel sticks end-to-end for several feet.)

Recipes

Like to cook? Then, become a metric chef. Try your hand at some recipes that give quantities in metric units. You'll need metric measures for them, of course, but that's no problem. You can make the measures yourself.

For small quantities, you will want milliliter measures. Since a teaspoon equals 5 mL and a tablespoon equals 15 mL, you can use a set of regular measuring spoons. Just mark them correctly.

For larger quantities, you will want a measure that holds 250 mL. As you know, 250 mL equals 250 cm^3, or a quarter of a liter. It's easy to make a measure of this size from a glass jar if you follow these directions.

> First collect the materials you need: a medium-size jar, some nail polish, an old-style measuring cup, and a set of measuring spoons.
>
> Pour water into the measuring cup until it reaches the 1/4 mark. Put this water into the jar. Next pour 3 tablespoons of water into the jar. Make sure the tablespoon is full to the brim each time you use it. Now dip out 1/2 teaspoon of water. You have 100 mL of water in the jar. Mark the level of water with a thin line of nail polish.
>
> To make the 200-mL mark, add another 1/4 cup plus 3 tablespoons of water. Dip out 1/2 teaspoon of water, and mark the level with nail polish.
>
> The last measurement will give you 250 mL. Add 3 tablespoons plus 1 teaspoons of water, and mark the level.

Ready to try out the new quarter-liter measure? If you want to make something that's really good - but simple - line up the ingredients for:

Beautiful Berry Milk Shake

200	mL	fresh berries
500	mL	milk
25	mL	sugar

Any kind of berry can be used. Blueberries that you have picked yourself are marvelous. Strawberries are good too. If you use them, cut them into small pieces.

Put the milk, berries, and sugar in a mixing bowl. Beat for a minute with an electric mixer or an eggbeater. Then pour into glasses and serve.

WHEN YOU COOK DINNER

Here's a delicious meal for six to eight people. It is made of two layers baked in the same pan. The recipe calls for a square baking pan 23 cm on each side, but any pan will do if the bottom area is about 530 cm^2.

Preheat the oven to 200°C. Then get together the ingredients:

Corn-bread-and-bean Double Feature

The Bottom Layer:

100	mL margarine
2	large onions
2	454-g cans kidney beans
2	227-g cans tomato sauce
10	mL chili powder

Cut the onions into very small pieces. Fry them in margarine until you can almost see through them.. Add the kidney beans and liquid from the can, the tomato sauce, and the chili powder. Cook for 5 minutes, stirring often. Then set aside.

The Top Layer:

250	mL yellow cornmeal
250	mL flour
50	mL sugar
15	mL baking powder
5	mL salt
1	beaten egg
75	mL margarine
250	mL milk

Mix the dry ingredients in a large bowl. Add the rest and beat the mixture with an eggbeater or an electric mixer until it is smooth.

The Combination:

Spread the bean mixture in the baking pan and cover it with the cornmeal batter. Bake for 1/2 hour at 200°C, until the top is golden brown. Let it cool 5 minutes before serving.

Marvelous Metric Pancakes

300	mL flour
5	mL salt
45	mL sugar
10	mL baking powder
2	eggs
45	mL oil
200	mL milk

Mix the ingredients together in a large bowl. Beat them lightly with a fork. Get the griddle ready by rubbing it with a thin coat of oil. Heat the pan, then test it with a drop of cold water. If the drop sits in one spot and boils away, the griddle isn't hot enough. If you have the right temperature, the drop bounces around when it lands.

Pour the batter from a ladle or a large spoon held near the griddle. The pancakes should be about 10 cm wide. Watch for bubbles. When they form, turn over the pancakes and cook the other side.

This recipes makes about fourteen pancakes enough for three people who are quite hungry, or for two who are starving.

Baird, Eva-Lee and Rose Wyler. (1980). Going Metric the Fun Way. Garden City, N.Y.: Doubleday and Co.

PARENT LETTER

DATE___________________

Dear Parent,

Your child will be studying "Measurement" for the next four weeks. We will be covering many topics in this unit; many are math-related but a few are not. Here are some ideas that we will be exploring:

Math - Why and How We Measure Things; Estimation and Precision
Language Arts - Books and Stories about Characters who are Very Large or Very Small
Social Science - Measuring Up to People's Expectations of Us; Our Own Expectations
Science - What Do Scientists Measure; Using Scales, Balances, and Thermometers
Art - Balance as a Design Element in Paintings; Balancing Mobiles
Music - Scales and Balance
Physical Education - Practice in Keeping One's Balance (on balance beams, etc.)

Please find time to do some of the activities listed below with your child this month. Your involvement in his learning is very important to him and to our program.

1. Post a growth chart in her room if there is not one already. Show him the baby book with records of her height and weight at birth or a growth chart form the doctor's file. Talk about how much he has grown; about the heights and weights of various people in your family; about the problems (and advantages) of being small, light, short, etc. or of being tall, heavy, and large, etc.
2. Ask him to help with measuring and cooking meals at home.
3. Show her blueprints to your house or the floor plan of your apartment building.

4. Take him along to a fruit, vegetable, seafood or meat market to observe weighing and measuring of food items.
5. Make a toybox or bookshelf with your child. Let her do the measuring and as much of the construction as possible.

As a closing activity, the students will practice their measuring skills by preparing a meal. We hope you and your family will be able to join us for supper on ______(date)______. A letter with more details will come soon. Please call if you have any questions at all or if you would like to visit our class.

Sincerely,

COLLEAGUE LETTER

DATE____________________

Dear Colleague,

During the next four weeks, our students will be exploring the topic of measurement. As usual, this unit will have an interdisciplinary approach. In mathematics we will cover the measurement of length, volume, mass and temperature. We will also be making graphs, charts and tables of actual measurements. While the primary focus of this month's study is mathematical, we will also study:

1. the use of balances and scales of various kinds in science;
2. balance as an element of design in art;
3. scales in music;
4. static and dynamic balance in motor activities;
5. expectations of ourselves and others and how we "measure up" to goals.

A practice for our measurement skills, we will be doing a good bit of cooking, and I expect that the children will want to share their creations. Please let me know if you would like us to prepare snack for your class one day.

The next page has a few teaching ideas for your centers which tie in with our study. I would be very pleased if you would share with me any ideas you have or lessons you have used on this topic.

As always I urge you to visit us whenever you have the time and please let me know if you would like additional materials or activities for our shared students. Thank you for your continued cooperation.

Sincerely,

Related Activities for Regular Education Classroom

1. Creative Dramatics Area: Clothing Sizes
Emphasis: Application of Measurement Skills

Feature dress-up clothes that emphasize growth and the roles we assume as we grow. Provide an assortment of clothes (from baby to adult) and sort the clothes into "small", "medium" and "large" boxes or hang them by size on racks. Post measurement sheets and provide tape measures for garments needing "alterations". Hem markers are fun here too. Take pictures for display if possible.

2. Free Time Reading Table: Book about Size
Emphasis: Bibliotherapy

Feature books that have words relating to size in their titles or whose topic is comparison of size and feelings about size. Suggested titles are:

Fey, James. (1971). Long, Short, High, Low, Thin, Wide. N.Y.: Crowell Company.
Iverson, Genie. (1979). I Want to be Big, N.Y.: E.P. Dutton.
Kuskin, Karla. (1979). Herbert Hated Being Small, Boston: Houghton-Mifflin.

3. Writing Center: Shape Booklet Emphasis: Creative Expression

Encourage children to make shape booklets by tracing their hands and then writing a "hand book". On a card or sign, suggest these story ideas.

How do your hands look?
What can you do with your hands?
What would happen if you had no hands?

Encourage children to draw in freckles, birthmarks, scars, fingernails and jewelry to personalize their hands. (You can also do this activity with feet, but it creates a little more commotion.)

4. Bulletin Board or Wall Display: "When I Get Big" Poster

Emphasis: Social Studies (Growth)

On a life-sized sheet of bulletin board paper, trace yourself. Then let girls in your room write what they would like to do when "they get big". Accept both career choices (e.g. be a nurse) and other answers (e.g. "wear makeup and have my own phone".) Repeat for boys with a male outline. If you have time discuss with them why one has to be "big" to do these things.

Play Group Ideas

1. Find a yard or vacant lot in which to erect a clubhouse. Ask all the students to bring scrap lumber, crates, etc. for building materials. Provide (or ask parents to provide) an assortment of tools and measuring devices (rules, levels, T-squares, etc.). After construction of the clubhouse, measure areas for curtains, rugs and other finishing touches. If there is time, construct bookshelves and furniture too. (Note: parents with carpentry skills are a must so that children's frustrations are minimized.)

2. Ask students to bring scrap fabric and sewing supplies as well as accessories such as belts, collars, shoes, etc. Design and make clothes or costumes. Books are available which give suggestions on making costumes without sewing. Allow plenty of time at the end for play and dramatic activities. (Note: Parents with dressmaking skills are invaluable for cutting and fitting. Keep machine sewing to a minimum though so that children can do most of the work themselves.)

PRE-TEST

1. What does the symbol " mean? ________________________

2. How many inches are in a foot? _______________________

3. How many feet are in one yard? _______________________

4. How many centimeters are in one meter?_________________

5. Is 32°F hot or cold? _________________________________

6. What is your normal body temperature? _________________

7. Name 3 instruments we use for measuring objects? ________
____

8. What unit would you use to tell about a person's
Height ____________________________________
Weight ____________________________________
Temperature _______________________________

9. What container sizes (or volumes) does milk come in?
Name as many as you can.____________________________
____

10. Why do we measure things? __________________________
____

Exploratory Activities

Language Arts/Exploratory Activities

1. Brainstorming: things that are long; things that are heavy; things that are hot; things that are deep. Note: this activity can be done just by leaving large sheets of paper hanging on the wall all week so that students can add to the list whenever they think of an appropriate addition; it can also be done on teams with each team taking a list.

2. A do-it-yourself antonym practice can be created by leaving out a pocket chart for the student's use and a stack of possible opposites on cards. All the antonym pairs should relate to measurement such as: heavy/light; long/short; near/far; tall/short; hot/cold. For language gifted groups make the antonym pairs more challenging such as gigantic/miniscule; enormous/microscopic; etc.

3. Sorting exercises can be simple or difficult. For beginning readers, label bins with "large" and "small" or "tall" and "short". Provide objects or pictures for practice sorting. For older students make the classification scheme more difficult by using bins with labels such as "Objects greater than three centimeters long" or "Pictures whose perimeter is less than one foot". Note: label the pictures or objects being sorted for more reading practice.

4. In the reading corner or book display provide stories or books about characters having extreme size: giants, dwarfs, etc.

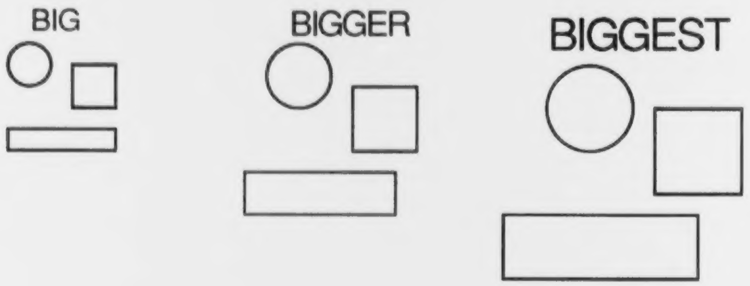
5. Provide a sorting game for synonyms of small and synonyms of large. Note: A thesaurus provides many alternatives from which to choose. (This activity can also be done on a pocket chart.)

6. Post signs in your classroom similar to road signs. Examples: Weight Limit 5 tons; Speed limit 25 miles per hour; Clearance 27 feet; Narrow Bridge; etc.

7. At the creative writing table, leave out the illustrated cover for a book called "Long Snake, Short Snake". Encourage children to

write and illustrate pages for it. Laminate and add it to the school's library collection or allow students with dramatic ability to read it aloud to a younger group when it's finished.

8. Leave pictures which illustrate comparative forms (example: big, bigger, biggest) out for student use on the felt board. The story of the three bears is an excellent one if you have the feltboard kit. You can also make your own objects of felt for this activity.



9. Brainstorm objects for theses combinations of attributes:

big and fast
light and big
light and slow
hot and fast

big and slow
heavy and small
light and fast
hot and heavy

heavy and big
light and small
hot and big
hot and slow

Long Snake, Short Snake

by Mr.__________________________'s Class

_____(Date)_____

Region VII E.S.C.
McCallister

Mathematics/Exploratory Activities

1. Provide various kinds of measuring tools for the children to examine and use in play or in actual measurement (depending on age and experience). Examples: rulers of various sizes and materials, yardsticks and meter sticks, a carpenter's folding rule, a tape measure of cloth, a retractable metal tape measure, T-squares or other engineering rules.

2. Allow students to draw their shadows at different times of the day and to measure them. For older students, compute the differences or display them in chart form. Encourage the students to look for patterns and to hypothesize about the cause of the varying lengths.

3. Put a chart on the wall with this question, "How long is this classroom?" Then leave spaces with the units of measure listed. Let students choose which way they will measure the classroom. (See below.)

   How long is this classroom?
   ___________ yardsticks long
   ___________ feet long
   ___________ children long
   ___________ math books long
   ___________ alligators long
   ___________ teachers long
   ___________ boxes long

4. Provide measuring spoons and cups of all kinds for the children to use and various things to measure. (Examples: sand, water, tiny gravel, grits, rice, etc.) Encourage comparison between the units of measure as they play.

5. Post measurement problems each week for the children to think about and then discuss their possible solutions on Friday. Examples of questions : How far is it from our ceiling to the floor? How far is it to the moon? Stress actual measurement versus estimation.

6. Display a large poster which obviously stresses the decimal relationship of the metric system. Next to it post the conversions for the English system.

LENGTH USING
THE METRIC SYSTEM

10 hectometers = 1 kilometer
10 decameters = 1 hectometer
10 meters = 1 decameter
10 decimeters = 1 meter
10 centimeters = 1 decimeter
10 millmeters = 1 centimeter

LENGTH USING
THE ENGLISH SYSTEM

1760 yards = 1 mile
3 feet = 1 yard
12 inches = 1 foot

7. Provide a number balance for the students for the exploration of the equality relationship between pairs of numbers.

8. Provide a set of crescent wrenches with the sizes clearly marked on their handles and nuts and bolts of various sizes for practice. (If these can be mounted on a board, more fun is generated.)

9. Display a set of nesting dolls from Russia and tape measures or rules for the children to use with them. Explore the measurement of diameters. (Other nesting toys can also be used.)

10. Choose one week of the unit to work with the idea of conservation for those children who need it. Provide containers of various heights and widths so that the children can experience the constancy of volume despite container shape. Each day change the containers (examples: vases, jars, cans, etc.) so that their experiences will be varied and repeated.

11. On a tray put a set of cans. For each can, provide a string which exactly measures the can's circumference. Allow the children to discover the relationship and match the strings to the correct can.

12. Put strips of tape on the wall in the following lengths and label them: one inch, one foot, one yard, one centimeter, one decimeter, one meter. Switch signs one day and see who notices.

13. Provide a postal scale and several letters for children to weigh.

Music/Exploratory Activities

1. Provide instruments which consist of the arrangement of various sizes of objects (example: xylophone with movable tubes). Allow the children to rearrange them and to discover the relationship between the size and the tone. Encourage them to play scales. Mix up the tones and ask children to find out where the wrong tubes are placed.

2. Extend the previous activity with bottles or glasses of water. Allow the children to measure and pour in the liquid and to "tune" the scale by adding to or taking away from the volume of water in the glass.

3. Play tapes of the major scales one day and minor scales a different day and encourage the children to notice the differences. Explain that these scales are used by all musicians to practice fingering, etc. Explain the terms "up and down" in relation to scales and keyboards.

4. Display music written on manuscript paper which the children will recognize. (Example: "Happy Birthday".) Music with lyrics written beneath it is best. Color-coded notes and a toy piano can also be used. Encourage children to notice notations for measures and time signatures, etc.

5. For children already familiar with musical notation, provide manuscript paper and suggest they write music during this unit. A parent volunteer who can help them write the music they play is a real help for this activity. Students can even write music, then swap with other students and try to play each others' compositions.

6. Create a scale on a stairway (if available) or use classroom blocks of various sizes to create levels on which the children

can climb safely. If the student walks up the stairs, play the notes which correspond to his movement; likewise, play descending notes as he comes down. If you are adept musically, you can create a song by allowing two (or even three) students to walk the stairs as you write the notation or play the notes. (Note: translating the pitch of notes into a kinesthetic experience helps even very un-musical children learn the concept of notation.)

7. Provide bells of various sizes (handbells, jingle bells or cymbals) for the children to arrange by size, by pitch, or by the volume of the sound produced. Drums can also be used for showing bass sounds in relationship to size of the instrument.

8. Display a metronome. Encourage children to play or dance to the beat. Explain speed or tempo.

Physical Education/Exploratory Activities

1. Mark off feet by putting tape on any blank wall. Number the marks from bottom to top. Encourage children to bounce balls of various sizes against the wall and to try to improve the distance thrown on subsequent tries.

2. Help the children explore their physical capabilities. Each day, ask a new question of them. Examples: How far can you jump from a standing start? How far can you run in 30 seconds? How high off the ground can you jump? How far can you throw a softball? Note: Let them work in pairs whenever possible. Extend this activity by providing stations each day and a time for practicing these tasks. Instruct them on form as necessary. Provide progress charts for children to see or record daily progress. Do the same activities at the end of the unit as a post-test. Congratulate improvement.

3. Provide equipment for the children to use which encourages practice in both static and dynamic balance. Balance boards, balance wheels and balance beams (both on and off the ground) should be explored by the children before guided activities begin.
4. Give each student an activity sheet which illustrates various balance exercises. Encourage them to time themselves as a

pre-test on the first day of the unit and then to practice these positions for the length of the unit. Test again at the end of the unit as an evaluation of the psychomotor portion of this unit; share the findings with each student.

5. Teach or post the rules for "Statues", a game which freezes people in awkward positions. Allow practice and play at recess, too.

6. Provide time for the students to explore walking on stilts. These can be as simple as those made of oatmeal boxes and string and as elaborate as wooden stilts.

7. Provide various objects for children to balance as they move (examples: small and large bean bags, books, throw pillows, etc.) For children who balance these objects easily, suggest trying to do so while ascending or descending stairs or while using the balance equipment.

8. Invite the children to bring toys requiring dynamic balance to school for the class to try (examples: roller skates, scooters, pogo sticks, bicycles with and without training wheels, etc.) Borrow the gymnasium or basketball court outside for balance activities involving safety cones or other boundary markers. Create exploratory activities involving speed, direction, balance and maneuvering.

Science/Exploratory Activities

1. Allow time for the students to explore the use of a balance. Younger children can use one with plastic coins for weights; older children will enjoy the metal weights with English or metric measures provided. Also provide a variety of materials to be weighed. Keep on hand various paper containers such as muffin papers so that curious students can also weight "found" objects.

2. Allow time for a similar exploration of the use of various scales. Provide both spring and electronic scales which measure in pounds and in kilograms. An excellent type of scale for comparing English and metric weights allows the user to flip a switch for alternate units of measure.

3. Encourage each student to weigh out a pound of something. Examples: feathers, gravel, lava rocks, sand, styrofoam packing, etc. Compare the volumes of each of these pound packages.

4. Provide a variety of thermometers for the students to examine and use. Include thermometers with mercury and those that change color. Encourage children to note and graph their body temperature, which varies throughout the day. (Note: remember to provide a means of sterilizing the thermometers once they are used.)

5. Provide charts or tables for the children to fill in showing the relationship between temperature and the time of day. Variations of this activity would include time vs. inside temperature; time vs. outside temperature; time vs. temperature in the shade; time vs. water temperature (as opposed to air temperature).

6. Explore the balance of toys which spin, especially tops and gyroscopes. Encourage the children to change the center of gravity of these toys by putting pieces of tape or other weights to one side of the object; ask how the amount of weight added or the placement of the weight affects the spin of the toy.

7. Provide plastic graduated cylinders for the students to use in deciding how much water a container will hold. Also provide pop cans, coffee mugs, teacups, vases, etc. to encourage lots of measuring.

8. Let the children take turns wearing a pedometer all day to see how far they walk while in school. Alternate idea: let them check it out for use in a 24 hour period (school and home).

9. Post a chart full of questions:

Which Is Heavier?

· a box or · a bag
· a paperclip or · a rubber band
· a pencil or · a crayon
· a hamster or · a mouse
· a scissors or · fifty pennies

Provide many materials (several sizes of pencils, paperclips, several boxes or bags) so that children will realize that the weight of objects varies. They may discover, therefore, that an absolute statement is not possible because the answer depends on which box is compared to which bag. See if quick-thinking students can find the one item on the poster which has a constant weight.

10. On a large tray, display a collection of leaves of various sizes or any set of natural objects. Encourage the children to compare size and to order them from largest to smallest. Try to provide extremes of size. (Example: An elephant ear leaf and a boxwood hedge leaf).

11. Provide cups or glasses of various liquids and a tray of student thermometers. The liquids should range from very hot to icy (with ice cubes in it). Have the students use the thermometers and record their temperatures. Talk about changes in temperature from the beginning to the end of the period.

12. Wad various sizes of tin foil paper into balls. Use them for children to measure.

Social Studies/Exploratory Activities

1. Display pictures of handicapped individuals who use walkers, canes or crutches to balance. Provide a copy of Balancing Girl (see Bibliography) for children to read.

2. Display pictures which show extremes of sizes (examples: a large athlete and a tiny baby, a basketball player and a jockey, etc.) Encourage discussions of these differences.

3. Share your collection of pictures (of yourself, your family, or your children). Help children see the progression of stages of

growth we all experience. Encourage them to share albums from their family, too.

Theatre/Exploratory Activities

1. Put a rope or tape on the floor for the high-wire-act pretending game. Add squares of cardboard (possibly covered with tin foil or painted with circus designs) for end platforms. Provide a balance pole or umbrella, costumes and circus music for this pretend setting.

2. Create a doctor's office with baby scale, tape measure, thermometer, etc. and provide baby dolls so that mothers, nurses and doctors can converse about the baby's health and growth rate. Also provide blank growth charts and folders, nurses' caps, etc.

3. Make a shoe department with appropriate furniture and displays. If possible, borrow a measuring device for children's feet showing length and width. Provide various sizes and styles of shoes for students' scenarios. For older students, provide scene-starters on index cards such as: a difficult or rude customer and a new saleslady, a; a mother and her child disagree on the type shoe to buy; a sale and everyone wants to be waited on first.

Visual Arts/Exploratory Activities

1. Provide construction paper, paint and eyedroppers. Display examples of pictures which have been made by folding the paper while paint is still wet to create mirror image designs. Allow the students to experiment with this technique until they realize that they are creating symmetrical designs. For younger students it may be necessary to give them only one color at first; then the element of balanced color in designs can be introduced.

2. Leave out for the children's use either a felt board or a magnetic board with geometric shapes for play. If you divide the board into two equal parts with a piece of yarn , they can practice balancing the design created on one side of the board

with a partner. "If I put this square here, where will you put your square?"

3. Allow the students to discover the effect of size of paper on their artistic products. From a roll of paper (any kind) offer them pieces of various sizes. "How many inches of paper do you want this time?"

4. Provide materials which can be arranged or organized from smallest to largest. Montessori materials are excellent for this kind of practice. Wooden puzzles can also be purchased for this kind of practice. Examples: a set of mixing bowls, nesting tupperware products.

5. Provide cutouts for the children to use in creating designs a la Henry Matisse. Leaving out an art history book open to the Matisse cutout works will help generate ideas and interest. Allow students to do their own cutouts when they have used up yours or have decided that other shapes and sizes are needed. Comment on the asymmetry of the pieces and of the asymmetrical balance of these works.

6. Leave pieces of colored paper at each place of an art table or area and on top of each paper put an envelope. In each envelope provide a number of shapes for the children to glue or paste in a design of their choice. In general, an odd number of pieces will produce asymmetrical designs and even numbers a symmetrical one (especially if you give them two of every shape). The students may create realistic or abstract designs but ask them to tell you whether they used symmetrical or asymmetrical design in each of their products.

7. Gummed shapes (either file folder labels or shapes cut from colored sheets with adhesive backing) can also be used to practice balance in design. For younger students or students not creatively gifted, limit the numbers and sizes of the design elements available. Encourage experimentation and changes in the designs.

8. Provide a flannel board each day for a week. Vary the materials you provide for use with it. (Examples: Seven lengths of yarn; seven widths of yarn; rectangles which vary in

length; circles which vary in diameter; etc.) Encourage ordering by size and exploration with balancing the shapes and sizes.

9. Teach the game of 3-dimensional checkers.

10. Provide a top shelf on a bookcase or a shelf on the wall and a box of knick-knacks. Let the children explore the arrangement of objects on the shelf until they find a pleasing combination. Take pictures of their "balanced" compositions.

11. Obtain paint sample cards from any paint store. Cut the paint chips apart. See if the children can sort the colors into cards again and arrange them from lightest to darkest or from least intense to most intense.

12. Post a sign inviting children to build a tower (of any kind of block) 1 meter tall.

Guided Activities

Language Arts/Guided Activities

1. Display these compound words and ask the students to read them, tell the two words that make them up and what the compound word means. Examples: lightweight, lighthouse, lightning, lightfoot, lightheaded, lighthearted. Discuss the different meanings of the word "light".

2. Generate compound words for other words dealing with measurement such as short (shortstop, shorthand, shortbread), long (longhorn, Daddy longlegs, Longfellow), or weight (heavyweight, weightless, weightlessness). This activity can be done individually or in teams, with a time limit or without.

3. For verbally gifted students, explore phrases which use the word "balance" such as "balance of power" , a "balancing act" , "balancing the checkbook" , " a balanced budget", "balance of nature" . If possible, find a reading passage in which one or more of these phrases are used. Check for comprehension.

4. Discuss the idea of multiple meanings by showing the students multiple entries in a dictionary. Discuss the possible meanings for words such as light, long, short, balance, scale, and weigh. Ask students to write sentences or draw pictures illustrating the various meanings of these words.

5. Discuss the etymology of "meter" and words having "ometer" such as speedometer, odometer, thermometer, and barometer. If possible, have these instruments or pictures of them to show the class. Make up words that could be used if you invented an instrument to measure something unusual. (Example: if you invented a machine which could measure how big a person's smile is, it might be called a "grinometer" or a "smilometer").

6. Talk about "weight" and "wait" ; give examples of other homonyms. Ask children to think of poems or paragraphs which use both words. "Weigh" and "way" can also be used.

7. Fill in a chart such as the one given below, inserting the plurals and discussing which are regular and which are not. Discuss the rules which apply to making plurals and why some words totally change form.

SINGULAR (One)	PLURAL (Many)
inch	
foot	
yard	
mile	
meter	

8. Teach the children to read the various parts of the words used in the metric system. Then mix and match them on the pocket chart mentioning whether they are for length, volume, or mass. Examples: centimeter, centigram, centiliter; deciliter, decimeter, decigram; kilometer, kiloliter, kilogram. Note: It is helpful at this time to tell the students objects which might be measured in each of these units.

9. Watch or read a portion of Alice Through the Looking Glass or Gulliver's Travels. Talk about the possibilities of changing size and exploring a new world. Ask the students to image themselves as very tiny in various places within your classroom. Examples: at the bottom of the pencil can, underneath a piece of furniture, hiding behind the eraser on the chalkboard ledge. Ask how they feel. Ask for them to draw or write about their adventures as a tiny person.

10. Spend a week telling "tall tales". Sample Paul Bunyan, Pecos Bill and Mike Fink. Talk about why they were "tall" tales.

11. Read aloud (or have a guest teacher read aloud) portions of The Hobbit by Tolkien. Discuss the other books Tolkien wrote and what a trilogy is. Show pictures of various people's illustrations of the characters.

12. Discuss the definitions for terms related to temperature: hot, cold, lukewarm, tepid, room temperature, etc. Try to write

them on a continuum from freezing to boiling. Explain "continuum".

13. List verbs which indicate speed -- zoomed, dawdled, sped, rushed, crawled, etc.

Mathematics/Guided Activities

1. Provide a sheet (see below) for those students who wish to participate. Measure the child or have partners measure each other and fill in the chart for body dimensions such as height, weight, head circumference, etc. If all the students wish to be measured, the following variation of the chart is possible. Measure all the students in secret and then post their dimensions (without names) on the chart. See if they can guess which numbers are theirs by comparing the values for the other students. (Note: If students are self-conscious about height and weight or are very good guessers, use more obscure body measurements such as wrist circumference or arm length.)

Student	Height	Weight	Head Circumference

2. Carefully trace students' hands and feet. Measure the length and width of each. Use the tracings for a mobile or collage and hang it in your classroom.

3. Have each student make up a unit of measure with a silly name. Decide exactly how long that unit will be and measure

various objects in the room using that unit. Note: a table in the corner may be 7 kwerps long and only 5 thads long. Explain the arbitrary nature of units of measure but the importance of the constancy of the unit. Make rulers marked off in thads or kwerps.

4. Measure objects with toothpicks or new pencils or paperclips. If your children are good problem solvers, give each one a different sized pencil to measure with and then ask them to compare answers. It may take them a while to discover the constancy of unit rule has been violated.

5. Have everyone in the class measure the same four things. Compare the answers by writing all the answers on the blackboard. Discuss why the answers are not precisely the same. Discuss precision as a necessary component of measurement.

6. Let each student choose a question from a hat. Guide them to find the answer by using concrete objects and experimentation. Encourage them to confirm their answer by using a reference book. Examples of questions might be: How many half-pints are in a gallon? How many pints of milk are in a quart? How many cups of water are in a pint? Provide materials for experimentation.

7. Ask a parent to come to school and construct a box or a bookshelf from plans he has drawn. Allow students to watch and ask questions about the measurements he makes and the plans he uses. Discuss his tools, especially the level, t-square and carpenter's rule. Perhaps the children can assist him in some of the tasks or paint the object after he has finished it.

8. In small groups, do conservation activities using clay, objects or liquids. Give students many experiences regarding the conservation of mass.

9. Examine boxes of food or other commodities which have weight or volume statements printed on the packaging. Compare sizes (and with older children, prices). If volumes or weights are listed in both English and metric units, compare the two units given. (Are liters of coke larger than quarts of coke?) Allow experimentation to answer questions generated.

10. For advanced students, explain three-dimensional graphing using a plexiglass model. Teach the proper notation (x, y, z) and talk about applications of 3-d grids in the "everyday world".

11. Discuss speed. Stress that all speeds are measured in a unit of length per a unit of time (e.g. miles per hour). Talk about slow speeds (inches per year) or fast speeds (miles per second). How do we measure the speed of cars? How do policemen know if a driver is speeding? Cover the abbreviation m.p.h. seen on street signs.

Music/Guided Activities

1. Introduce the idea of measures in music and beats in a measure. Some simple activities which lead up to counting measures in music are: counting syllables in children's names, repeating the name over and over until the beat is felt, dancing to their name; chanting and clapping until the beat is felt; playing "repeat the beat" in which the teacher slaps or beats on a drum and the children must listen and repeat her rhythm.

2. Use any favorite record as listening and counting practice. For each song give listen, clap, and dance. Use only one cut from the record each day. Supply many songs to the children which are written in this meter and which they already know. Give them lots of opportunities to listen to music and play instruments in the appropriate meter.

3. Display oversized music staffs and introduce the meter signature which appears at the beginning of each piece of music. Have students clap the rhythms you have written for 4/4, 3/4, and 2/4 time. If they easily follow these rhythms, introduce odd-numbered beats (such as 5/5) as well. Allow them to flip through music books finding these time signatures for songs they know.

4. Roll out shelf paper on which you have drawn musical staffs for the treble clef and marked out measures in 4/4 time. Give each student four black circles to glue on the lines or in the spaces as he wishes. Add the the stems of the notes with black

marker and then play the composition they have written. Note: You may have to be very creative to find an ending for such a work. Remind them that the four notes are needed because each is worth one count or beat.

5. An extension of activity four is an individual follow up composition which the students can then share at the end of the week. If your students are musically gifted, give them the choice of other meters or of changing meters within their piece.

6. Teach the students new songs about measurement, such as "Inchworm". Discuss inchworms if they are interested.

7. If your school has a sound system with stereo speakers, show the students how to balance the sound between the two speakers. (Demonstrate sound from the right speaker, then the left. Then show how the sound is balanced.) If your system also has bass/treble control or an equalizer, show how to balance the high and low sounds as well.

8. Play music which is light (Tchaikovsky's "Dance of the Sugar Plum Fairy") and heavy (Beethoven's "Ninth Symphony"); play large music ("1812 Overture" by Tchaikovsky) and small music (Debussy's "Cakewalk" from the Children's Hour Suite). Play music which grows in size (Ravel's "La Valse" or "Bolero"). Let them dance or play along.

Physical Education/Guided Activities

1. Tell the story of the Greek marathon. Describe the marathon race of today and discuss the use of the word "marathon" in other contexts. Stress the endurance needed to complete a marathon and the commitment which marathon runners have.

2. After the students have explored the equipment for balance exercises (such as the balance board and balance wheel), give guided practice on this equipment and the balance beam. Balance beam activities include walking forward, walking backward, walking forward heel to toe, walking forward on tiptoes, walking forward with eyes closed. Note: All these activities should be done with a spotter.

3. Provide practice in balancing objects while walking. Place beanbags on various parts of the child (examples: on shoulders, on backs of hands with outstretched arms, on head, on elbows with arms at shoulder height). For physically gifted children, repeat these placements while children ascend and descend stairs.

4. For fine motor development, ask children to stack objects into towers. Small blocks of a uniform size can be used. A variation of this practice can be done with diverse objects of many sizes and shapes (Example: a tower consisting of a coffee mug, a small book, a tape case, a large coin, and a pencil.)

5. Play the mirror game in which one person leads and the second person (who pretends to be his image in a mirror) follows. Ask the leader to do unusual movements requiring balance and to hold positions in space for at least five seconds. Encourage creativity in the the movements.

6. Have a tournament of games requiring balance such as "Twister".

7. Play "Mother, May I" and later discuss the variations in sizes of movements (giant steps vs. baby steps) and variations in people's movements (teacher's giant step vs. a student giant step). Make an informal hierarchy of Mother, May I movements according to distance covered. Encourage students to make up non-traditional movements to add to the game.

8. If you have access to appropriate equipment and space, conduct a gymnastics unit or invite a P.E. teacher to do so.

9. Discuss endurance. What activities require endurance? Tell how to build endurance. Let the children each choose an endurance activity to work on every day of the unit. Encourage them to also do this activity at home on weekends. Measure the increased endurance at the end of the unit.

10. Talk about the relationship of weight to speed and weight to distance. Demonstrate by having several children throw light balls and heavy balls. Which kind of ball can you throw farther? Have other children run a distance. Then have the

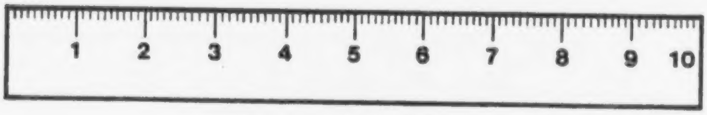
same children run the same distance carrying a weight. Which times were faster? Explore the idea of energy and work.

Science/Guided Activities

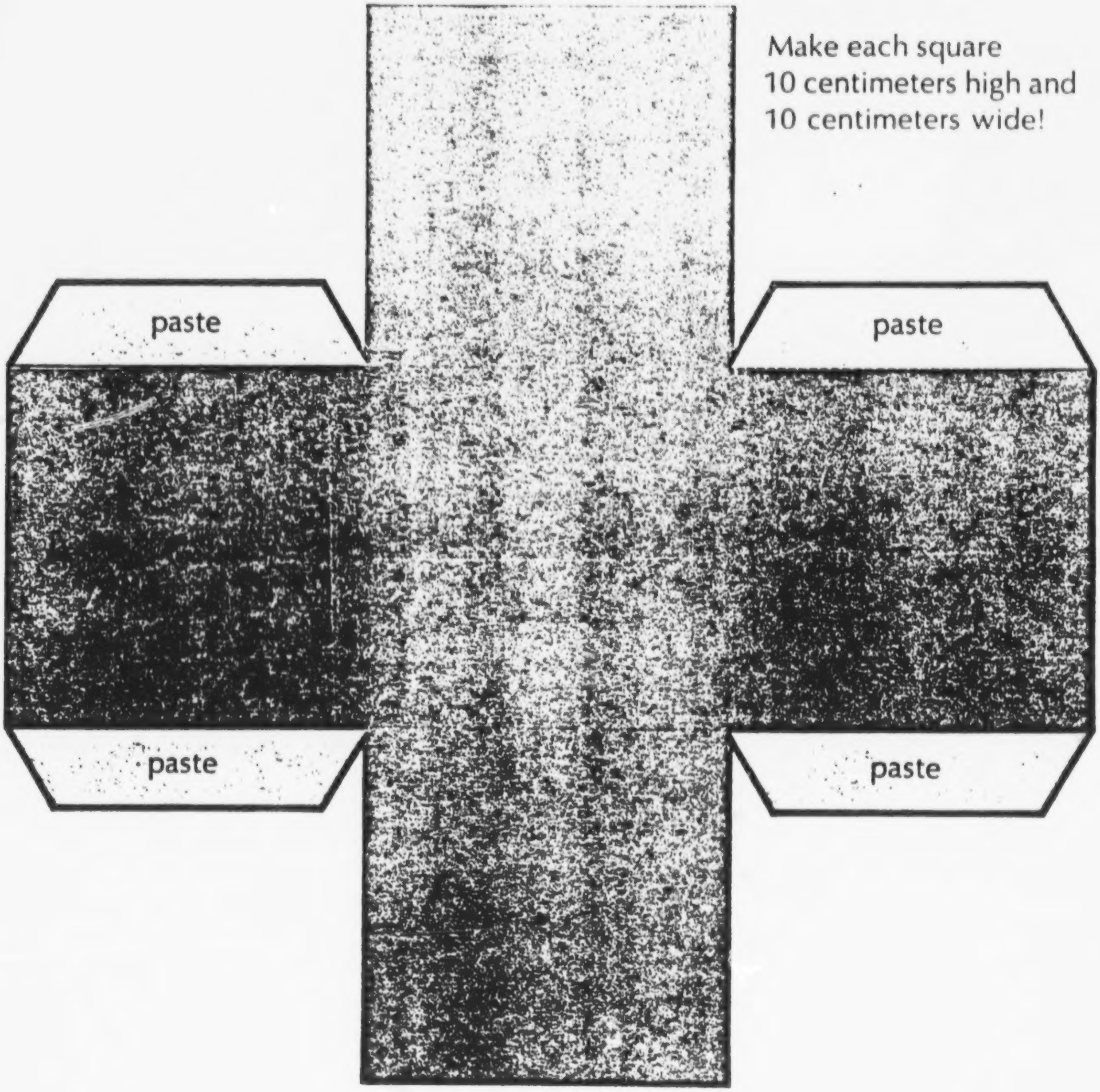
1. **Making a Liter Box**. Follow the directions from A LITER IS by Jerolyn Nentl. (See bibliography). Help the students read and follow the instructions. Leave the liter box out after it is completed for future use in exploratory activities.

A Liter Is . . .

You can make your own liter box by using the meter stick you made in the book, "THE METER IS." On a piece of heavy paper or lightweight cardboard make a drawing like the one on the next page. Each square should be 10 centimeters high and 10 centimeters wide. In the drawing the squares **are not** 10 centimeters. To make sure your drawing is the correct size use the 10 centimeter scale below which is 1/10 of the meter stick.



10 centimeters


paste
paste
paste
paste

Make each square
10 centimeters high and
10 centimeters wide!

DO NOT TRACE THIS DRAWING.

Now that you have the box complete, use the 10 centimeter scale to mark the outside of your liter box. The centimeter markings will let you estimate about how much liquid volume things have. Line the box with a small plastic bag to make it waterproof. All the measurements you will make with your homemade liter box will not be exactly accurate. But the homemade liter box is a good way to get an idea of how much a liter really is.

Now let's try out the liter box. Start with something small. One teaspoonful of water will barely cover the bottom of the liter box because it equals only about five milliliters. Two teaspoonfuls of water will equal only about 10 cubic centimeters or 10 milliliters. A tablespoonful of water equals about 15 milliliters. Try a cup of water and see about how much it measures.

Now take an empty quart milk carton and fill it with water. Try it and see about how much it measures. It almost equals a liter, doesn't it. To be sure, fill your liter box completely full with water and then very carefully try to pour all that water into the empty quart carton. A liter holds just a little more than a quart.

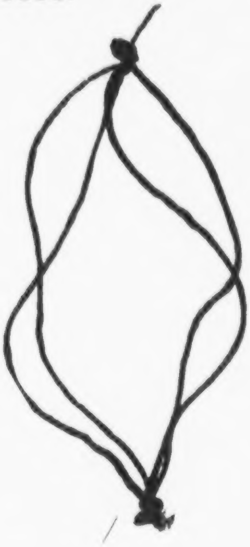
Nentl, Jerolyn Ann (1976) The Liter is... Mankato, MN: Crestwood House.

2. Making a COAT HANGER balance. Pass out copies of the instructions from The Gram Is by Jerolyn Nentl on how to make a balance. Then provide materials for them to do so. Note: Children may work in groups or individually.

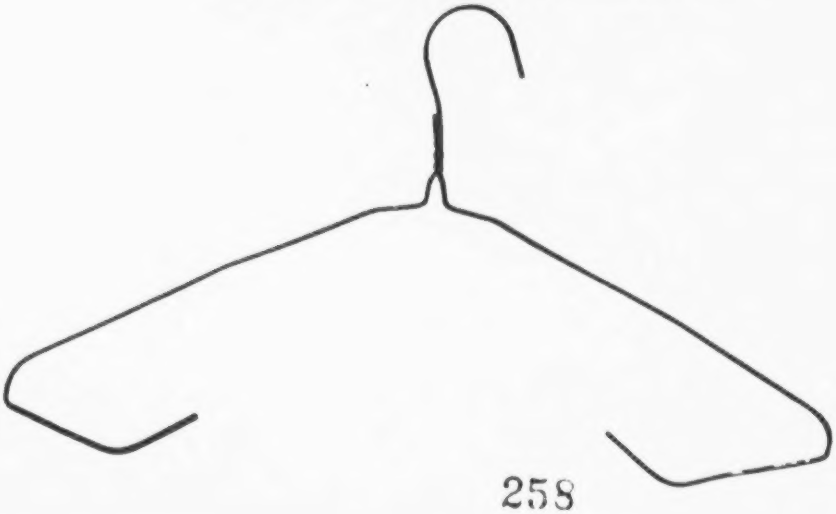
You can do some interesting experiments by making your own balance scale.

To make your balance scale, cut eight pieces of string or cord or yarn of equal length. Try making them about 50 centimeters long, using the meter stick you make when you read the book, "THE METER IS."

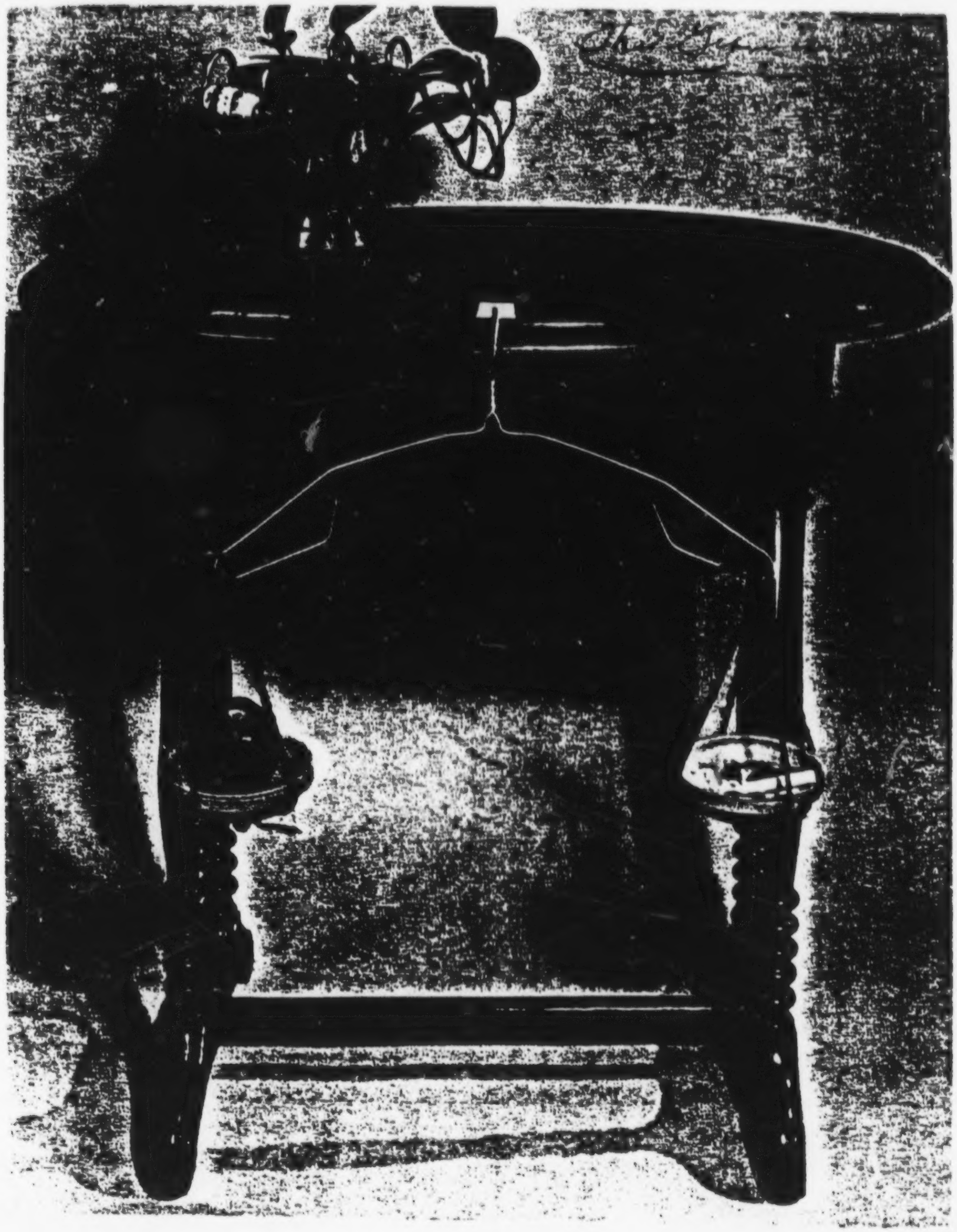
Now put four pieces in one pile and four in another pile. Then tie the four in one pile together in a knot at the top and in a knot at the bottom to make a sling. Do the same with the other four pieces.



Next take a coat hanger and have an adult cut the middle part of the horizontal piece out and throw it away. Turn up each end to make a hook. Also turn the part you use to hang up the coat hanger sideways.



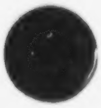
Now your coat hanger should be able to hang on a table edge. Does it? Be very careful of the sharp edges. Use a piece of cardboard or other heavy paper to protect the table from scratches.



Hang one sling by one of the knots you tied on one hook and the other on the other hook. Next take two small saucers that have exactly the same mass and set one in each sling that you made. If you use plastic saucers you won't have to worry about breaking any dishes.

ABOUT 1 GRAM
paper clips

ABOUT 3 GRAMS
pennies



ABOUT 5 GRAMS
nickel

ABOUT 10 GRAMS
pieces of chalk

To find the mass of an apple, put the apple in one saucer. Then put nickels, pennies, paper clips, or pieces of chalk in the other saucer until both saucers are straight across from each other, or balanced. Use the chart above to figure out how much the mass of the apple is. Now you are ready to begin other experiments.

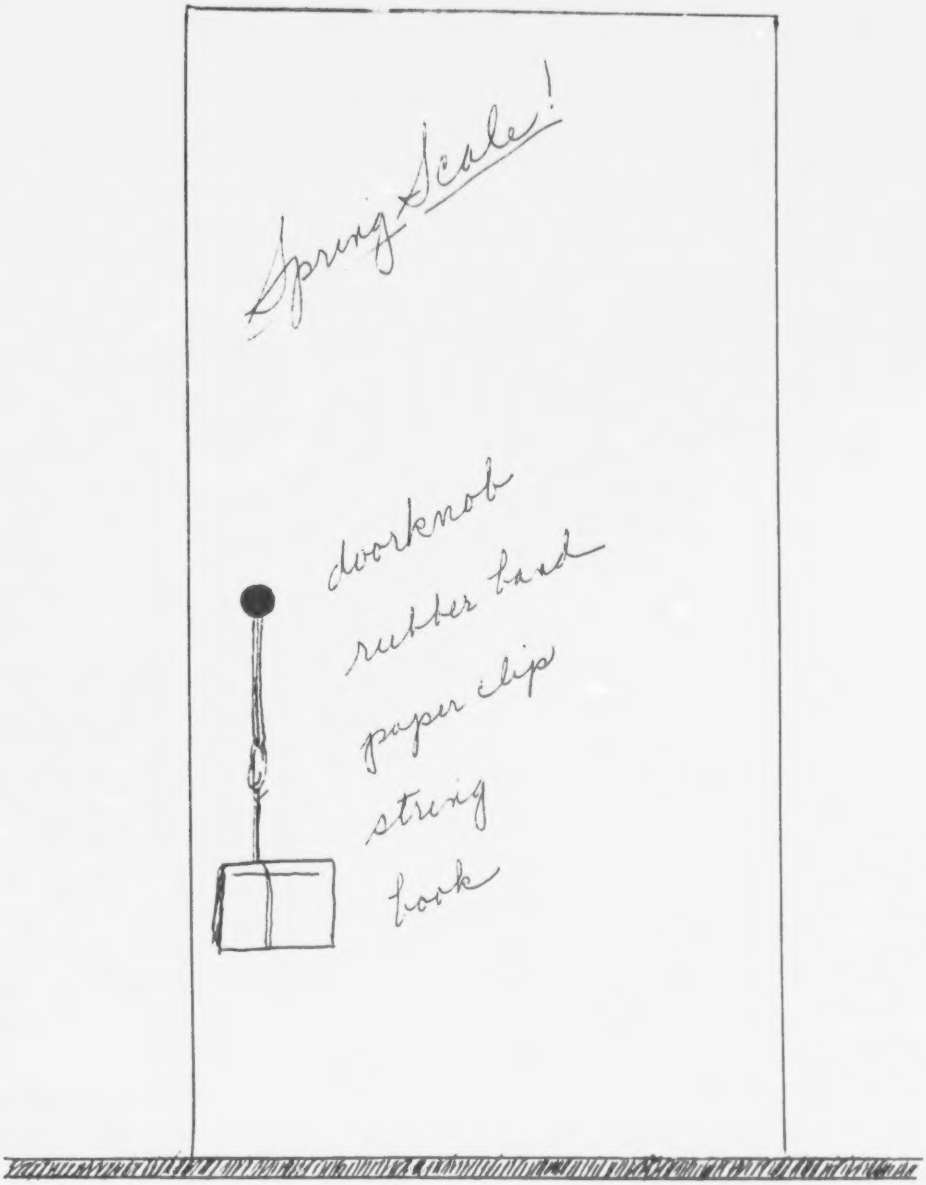
Nentl, Jerolyn Ann (l976) The Gram Is... Mankato, MN: Crestwood House.

3. Explore volume: Get a large coffee can or other medium-sized container. Fill it with rocks. Ask, "Is it full?" Fill it with bee-bees. Ask, "Can it hold anything more?" Fill it with sand and repeat the question. Add water. "Now is it full?" Discuss volume.

4. Show a board with a movable fulcrum. Try to balance the same two objects on the ends of the board while changing the

9. Try the demonstration on spring scales from Tillie Pine's book, Measurements and How We Use Them. If possible, take apart a bathroom scale so children can see the mechanisms inside.

> Would you like to know how your scale works? Do this and you will understand. Hang a strong rubberband on the knob of your kitchen cabinet. Tie a cord around an small book. Hook a paper clip to the cord. Hook the other end of the clip to the rubberband. Let the book hang freely. What happens? The weight of the book stretches the rubberband. Be sure to measure the length of the stretched rubberband with your ruler. How long is it? Take off the small book and hook a larger book to the rubberband. Let this book hang freely. Now measure the length of the stretched rubberband again. You see that the weight of the larger book stretches the rubberband more than the smaller book did. The larger book is heavier than the smaller one and it stretches the rubberband more.
>
> When you step on your bathroom scale, you make something stretch inside the scale. It is not a rubberband that stretches. It is a thick spring.
>
> This spring is attached to a bar. The bar also has a thin stretched spring attached to it. The other end of this spring is attached to the cogwheel which is attached to the dial. The picture shows you this.
>
> When you step onto the scale, the thick spring stretches. This releases the stretched thin spring. The cogwheel and the dial turn. When the dial stops moving, the pointer shows your weight in numerals. It tells you the number of *pounds* you weigh. We call this scale - a *spring scale*.


Spring Scale!
doorknob
rubber band
paper clip
string
book

Source: Pine, Tillie S. and Joseph Levine (1974). Measurements and How We Use Them. N.Y.: McGraw-Hill.

Social Studies/Guided Activities

1. Talk about careers that require good balance. What are some of the good things about being a gymnast, for example? What are some of the drawbacks? Repeat for steeplejack, etc.

2. Talk about careers which require that you be very tall (professional basketball) or very small (professional jockey). Talk about exceptions to these rules who succeeded. Does our society value people who are big? Are there jobs in which size does not matter?

3. What jobs require strength and endurance? How do these people become strong? What stereotypes do we have about males and females and their ability to do these jobs?

4. **Day 1:** Define "expectations". Ask what expectations the chldren think you have for them (e.g. to study and learn). Make a list of some expectations parents have for children (e.g. to keep their rooms clean). Do you have expectations for the behavior of your friends (e.g. to share toys)? Discuss many kinds of expecetations.
   Day 2: What happens when expectations are not met? Ask students to share examples of not being able to meet an expectation. What does "disappointed" mean? Were you ever disappointed when a friend did not do what you expected? Talk about the feelings of both parties.
   Day 3: Do you ever expect too much of yourself? Discuss perfectionism, realistic goal-setting. Do you ever get disappointed or frustrated when you cannot "measure up" to your expectations?
   Day 4: Dealing with expectation is difficult. Ask children to list some realistic and unrealistic expectations that they might have for themselves or that others have for them. Talk about the unrealistic expectation that some teachers have that gifted children never make a mistake. Explain why this expectation is unrealistic.
   Day 5: Talk about making mistakes, learning from them, and doing better the next time. Talk about rejecting or modifying others' expectations for you. Talk about grades if they seem to be a problem for members of your group. Are their unreasonable expectations about report cards?

5. Post a sign or poster for the children to discuss.

    1. The tallest man should be president.
    2. The strongest man should be president.
    3. The smartest man should be president.
    4. The best leader should be president.
    5. The most handsome man should be president.

    Talk about why the children agree or disagree with the statements. Try to explore the idea of matching the attribute to the requirments of the job. Explore the idea of a leadership and what it means. If there are elections coming up, talk about candidates and why people might vote for them (e.g. appearance, experience, ideas)

6. Explain "balance" in our government. Show a diagram of the three branches of government. Tell how each serves as a watchdog on the other two. Illustrate "balance of power" by telling the children about recent legislation that was vetoed or about supreme court rulings overturning laws. Discuss the unlimited power of dictators, etc. in countries where there is no balance in government.

7. Bring a census report for your area. Talk about "measuring" people. Explain the "family unit". Discuss possible reasons why the government might want or need to know about the population. Tell the children some of the interesting statistics for your town or county. Describe population by sex, race, age, etc. Extend the lesson by sharing demographic data from your school district on the numbers of children in each grade, each school, etc.

8. Discuss pay scales. Give various hourly wages for careers the children recognize. Put them on a ladder or continuum from highest to lowest. Ask about the value of work. Discuss sex discrimination in wages if it seems appropriate.

9. Discuss growth by asking a series of questions. Do not comment on the answers. Let children express themselves freely.

   How do you know you are growing?
   Do all things grow?
   Do grown-ups still grow?
   Do old people grow?
   Do you thing you will ever be six feet tall?
   Is it good to grow?
   Is it hard to grow?
   What can you do to help your body grow?
   Can you ever decide to stop growing?

Theatre/Guided Activities

1. Practice movements which help portray the physical appearance of characters. How does a giant move? How does a fairy move? Apply this movement idea to music. Play "heavy" music and ask the children to move to it as if they are made of concrete or other heavy materials. Play "light" music and ask them to move as a feather might. Ask them to draw comparisons between ballet dancers and football linebackers.

2. Pantomime stories such as "Jack and the Beanstalk" in which there is a clear difference in the size and weight of the characters. Stress the speed and quality of movement of the giant vs. Jack.

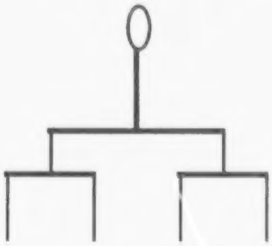
3. Act out the three bears story. Remind the bears that their movements and their voices must reflect their size. For fun allow the smallest student in the class to be the papa bear and the largest to be the baby bear. (A true test of a good actor is to belie his own size and weight.)

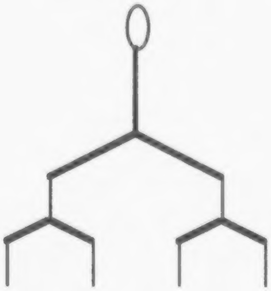
4. Bring several play scripts for children to look at as you explain the idea of acts, scenes and lines in a play. Discuss and define intermission, why we have it, and what goes on backstage during it. Ask students to relate experiences of going to see a performance in several acts and what they did during the intermissions. For boys interested in sports, relate intermission to half-time or the seventh inning stretch.

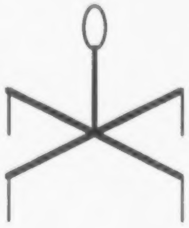
5. Do several exercises to impress on children the effect of height on a person's attitudes and behavior. Play a scene in which one child takes the role of a leader. Play the scene again with the child on a chair while delivering the lines. Play the scene again with everybody else on a chair and the child on the ground. Discuss how he felt each time. Ask the crowd how they felt about him each time. (Note: If you're really brave, try teaching at the same eye level as your group, e.g. on your knees. Better still, put them on chairs and you sit to teach. Explore grown-up child relationships in this light.

Visual Arts/Guided Activities

1. Create mobiles using various shapes to demonstrate the necessity of balancing the sizes of objects involved. Younger students can use paper objects for their mobiles. Older students can try three-dimensional objects which are more difficult to balance and hang. An effective demonstration on balancing mobiles can be done if the teacher will create a finely-balanced mobile and then demonstrate the effects of cutting slivers of paper from one object or another (resulting in a lopsided mobile.). Ask students to create several mobiles using various structures and materials. Pieces of wire cut from coat hangars, plastic drinking straws, wooden dowels or even sturdy cardboard can be used for the basic mobile structure. Various designs include the following:







2. Show and discuss these examples of symmetrical balance in art:

Three Musicians by Picasso
Brooklyn Bridge by Stella
Adoration of the Lamb by Van Eyck
February Thaw by Charles Burchfield

Family Unit by Alexander Brook
Monhegan Theme by Lamar Dodd
Still Life: Lemons, Oranges and a Rose by Zurbaran
Autumn Rhythm by Jackson Pollock
Gate of Peace by Shiou-Ping Liao
American Gothic by Grant Wood
Thrust by Adolph Gottlieb
As You Like it by Man Ray

3. Show and discuss these examples of asymmetry in paintings:

The Artist's Bedroom at Arles by Van Gogh
Vegetable Gardens by Van Gogh
Rocks on Beach by Nicholas de Stael
Suprematist Composition by Kasimir Malevich
Spring Landscape by Grant Wood
Bird Cloud by Lyonel Veininger
Maelstrom with Blue by Alexander Calder
Below Dover by Andrew Wyeth

4. Discuss the concept of color having weight. Show "Untitled 1956" by Rothko and talk about the weight of the colors he used. Ask why the darker colors appear at the bottom of the picture. Ask them to do a picture using dark colors (heavy ones) at the top of their page. After displaying these, ask how the pictures make them feel. Discuss the lightness of sky colors as opposed to earth colors and ask students to create abstracts which either follow or ignore the "weight at the bottom" rule.

5. Show pictures of the paintings and sculptures by Degas and discuss his fascination with ballerinas and their appearance. Talk about the poses of the dancers and the balance they possess as well as the balance in Degas' s work. Ask the students to create pictures of bodies in unusual positions. (Note: the students may find it difficult to draw bodies which are not in the usual standing upright position which is their stereotype at this age. Either provide a wooden mannequin as a model or ask different students to model body positions. Provide lots of encouragement and help for those students attempting to draw unusual body forms in space.)

6. Show the work of Piet Mondrian and ask the students to create a Mondrian-like work. Supply large sheets of posterboard and

black tape of varying widths. Poster paint can then be used for the colored segments. Note: you may have to help them balance size and color. What appears simple in the Mondrian work is actually very difficult to accomplish. Older students may want to do rough sketches before their final product.

7. Show students a drawing in which many objects are drawn from the foreground to the background (for example fence posts) and which demonstrate the perspective rule. Ask them to remember the size of airplanes taking off and climbing high into the sky. Does the airplane actually get smaller as it climbs? Does it actually become bigger again when it lands? Ask them to try drawing trees or telephone posts in this way, decreasing in size as they get closer to the horizon. (Note: This concept will be extremely difficult for the younger children.) Emphasize that although the objects when measured are exactly the same, their appearance (because of our visual system) is different.

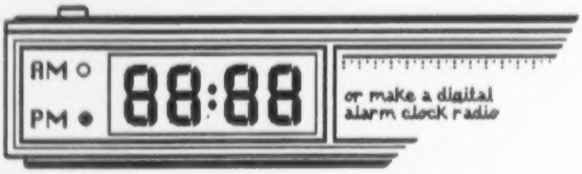
8. Use paint chip cards to illustrate the "visual scales". Show how the addition of more and more white leads to the lighter and lighter pastels. Repeat with black and shades. Show color wheels or color charts and see if the children can relate pastels to treble sounds and shades to bass sounds. (If you are very clever, you can play a series of color chips on the piano keyboard. Go up for lighter tints and down for darker shades.) Note: Limit yourself to one color for simplicity.

9. Do visual progressions and visual analogies with the children. Many commercially prepared materials are available. After the children have been introduced to these kinds of activities, leave work pages out for voluntary use during exploratory time. (Note: An interesting pre and post-test would be the Test of Nonverbal Itelligence or TONI which uses such progressions.)

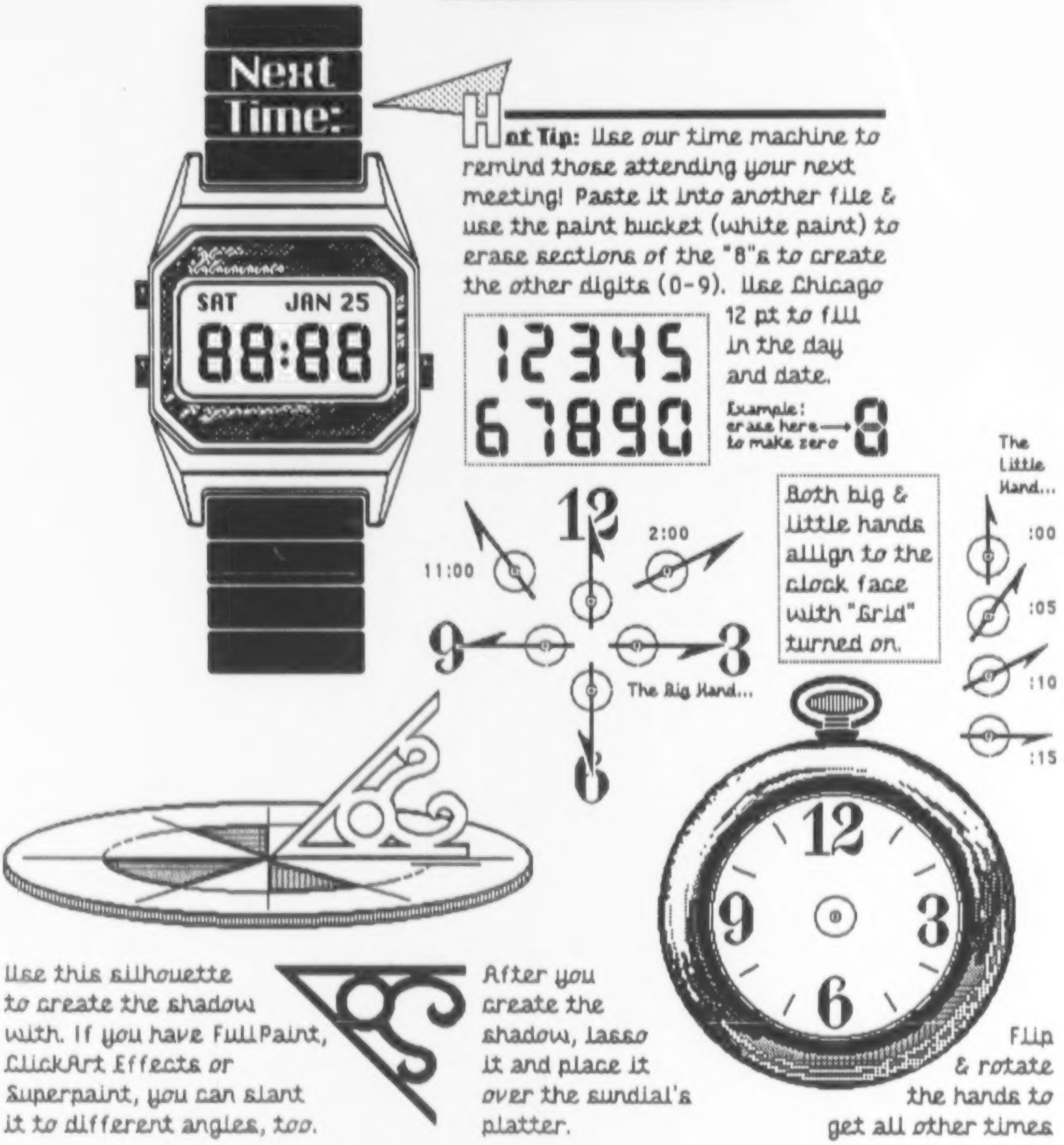
10. Use cutouts of various shapes (symmetrical and asymmetrical to illustrate the "line of symmetry". Hand out several shapes for the children to fold. Have them draw in lines of symmetry they discover. Show that a square has several lines of symmetry. Let them try a circle and draw all the lines of symmetry they find. Give cutouts which have no line of symmetry. Discuss bilateral symmetry with respect ot their bodies. Discuss why we have to be symmetrical "about the vertical axis" (balance).

Free and Inexpensive Teaching Resources

Food for Thought. Chevron Chemical Co. P.O. Box 7144 San Francisco, CA 94120-7144	Booklet on projects, experiments, games and crafts to teach nutrition.
The Potato: Something Good that's Good for You Poster. The Potato Board 1385 S. Colorado Blvd. Suite 512 Denver, CO 80222	Poster with riddles and games



or make a digital alarm clock radio


Next Time:
SAT JAN 25
88:88
12345
67890
12
2:00
11:00
9
3
6
The Big Hand...
The Little Hand...
:00
:05
:10
:15
12
9
3
6

Hot Tip: Use our time machine to remind those attending your next meeting! Paste it into another file & use the paint bucket (white paint) to erase sections of the "8"s to create the other digits (0-9). Use Chicago 12 pt to fill in the day and date.

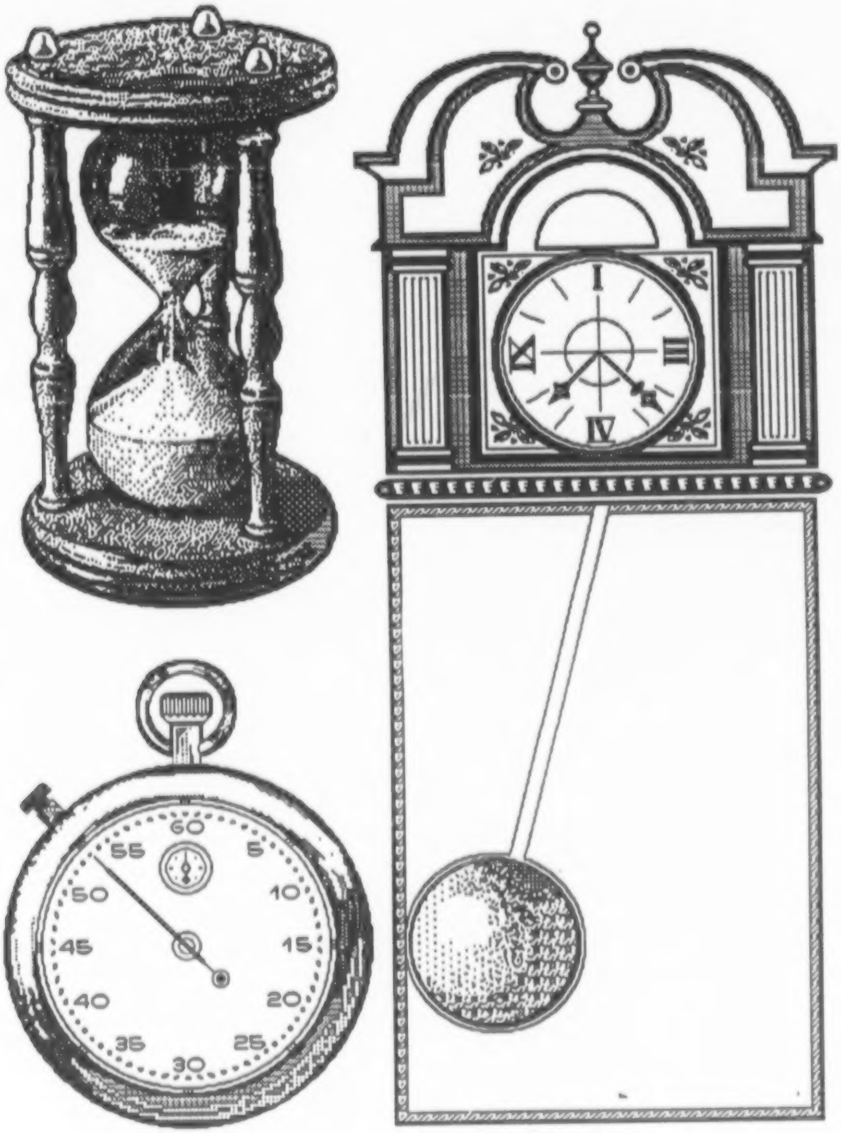
Example: erase here → to make zero

Both big & little hands allign to the clock face with "Grid" turned on.

Use this silhouette to create the shadow with. If you have FullPaint, ClickArt Effects or Superpaint, you can slant it to different angles, too.

After you create the shadow, lasso it and place it over the sundial's platter.

Flip & rotate the hands to get all other times


I
III
IV
IX
60
5
10
15
20
25
30
35
40
45
50
55

Questions and Topics for Independent Study

Questions

How do you measure...a horse, farmland, the length of a horse race, the distance a boat travels at sea?

What are these old units of measure and are they used today...a cubit, a fathom, a rod, a peck, a dram?

What kinds of equipment do gymnasts use when they compete?
What is a metronome? What does it measure?
What is equilibrium?
How do animals keep their balance?
How do pilots or astronauts keep their craft properly oriented?

Topics

Lord Kelvin
Gabriel Mouton
The Boston Marathon
Nadia Comaneci
Mary Lou Retton
The Inner Ear
Pygmy Tribe
Yaw, Pitch and Roll

Closure Activities

1. Invite the parents and siblings of the class to a dinner meeting and have the children prepare the meal. (You may want to do this at someone's house rather than at school because of kitchen size.) Each student or each group of students can prepare one dish. Sample recipes (pages 57 to 59) included and have been prepared successfully by K-2 students! Also have the students plan the dinner including the number of people coming and the supplies they will need to buy; choose a

committee for making invitations, making placemats or table decorations, etc. Make lists of jobs and deadlines such as seating charts, clean-up, etc. Afterward evaluate the cooking and the support activities. If you are daring, create menus and have the students serve as waiters; buffet dining, however, is much simpler. (Note: students get to take the leftovers home of the dish they prepared .)

2. Have each student choose a recipe from a children's cookbook (see bibliography). Let him read it, follow directions, then serve it to the faculty or to his homeroom class. (Note: Students will need help in estimating amounts to be prepared for large groups.)

3. Have the students invent recipes (at home) and then write them down and compile them in a cookbook to be dittoed and given away or printed for the school or local library. Note: Insist that the children try these recipes before they turn them in! A variation of this activity is the "Grouch Cookbook" featuring such delicacies as sardines with syrup. (They do not have to try these recipes!)

4. Have a scavenger hunt (by individuals or by teams). This hunt could be limited to your own room or could include other parts of the school when arrangements have been made in advance with teachers or administrators. Items on the list might include:

   something less than 2" long
   something weighing more than 1 pound
   something higher than 10 cm
   something weighing less than 1 kilogram

   Have children actually measure the objects when they are finished collecting them to prove that they are correct. Note: Allow time for students to return all these items. (This activity can be used to evaluate student's proficiency in estimating.)

5. Play an estimation game and give prizes. Collect objects for each of the categories: height, weight, length, width, speed, volume, etc. Have each individual or team write an estimated answer for the object's characteristics. Precisely measure the object to determine the winner. Total points and give "Excellent Estimator" awards or certificates.

Recipes for Parent Dinner

HAM CASSEROLE

Boil 2 cups of water,
Stir in 2 tablespoons of butter.
Add package of noodles (with sauce).
Boil for seven minutes.
Put in casserole pan.
Repeat.
Add 3 cups of ham,
2 cups mushroom
BAKE 10 MINUTES AT 350^{O}F.

TACO CASSEROLE

Layer:
- 1" chips
- 2 cups tomato sauce
- 3 cups meat
- 1/2 cup onions
- 1/2 cup olives

Repeat.
Cover with Cheese
Bake 20 minutes at 350^{O}F.

GRAHAM CRACKER BARS

Preheat Oven to 350^{O}F.
Put:
- 1/2 cup butter in pan in oven

Sprinkle:
- 1 1/2 cups graham cracker crumbs

Pour:
- 1 can condensed milk on it

Sprinkle:
- 6 ounces chocolate
- 1 1/3 cups coconut
- 1 cup nuts

Pat.
Bake 25 minutes.
Cool.

VEGETABLE CASSEROLE

Mix:
- 1 cup corn
- 1 cup green beans
- 2 cups carrots and peas
- 1 can cream soup

Sprinkle with croutons.
Bake 20 minutes at 350°F.

PEANUT CEREAL CANDY

MIX:
- 3 cups cereal
- 1 cup peanuts

Mix:
- 1/2 cup sugar
- 1/2 cup corn syrup

Cook and stir until it boils.
Add:
- 1/2 cup peanut butter
- 1/2 teaspoon vanilla

Pour over cereal and peanuts.
Stir and pat.
Cool.

FRUIT SALAD

Mix:
- 1 cup raisins
- 1 cup cherries
- 1 cup pineapple
- 1 cup oranges
- 1 cup peaches
- 2 cups Cool Whip

Sprinkle:
- 1 cup nuts (on top)

TUNA CASSEROLE

Layer:
  3 cups macaroni
  1/2 cup mushrooms
  1 cup cream soup
  1/2 cup tuna
  8 slices of cheese
Repeat.
Bake 20 minutes at 350^{O}F.

Unit Evaluation

Evaluation of the student's progress may include but not be limited to:

1. Achievement of short term objectives regarding participation and products.

2. Satisfactory ratings on Skills Checklists designed for the subject area.

3. Completion of culminating product or performance (individual or group) requiring synthesis of major concepts taught.

4. Score of 85% or greater on a chapter test from a mathematics basal text. (Note: For kindergarten and first grade students use a test from a second grade text; for second grade students use a test from a third grade text.)

5. Adequate score on a "measure lab" exam. (Satisfactory measuring by the student of ten every day items.)

6. Successful interview of student (oral or written) about his learning performance.

Vocabulary

acre
acrobat
act
asymmetry
asymmetrical
attribute
balance
balance beam
balanced meals
bar graph
bass
blueprint
Celsius
Centigrade
centimeter
chart
circumference
cold
collage
compare
composition
cubic centimeter (cc)
cubit
cup
decimeter
degree
design
diameter
dimension
direction
distance
distant
dwarf
endurance
English units
equilibrium
estimate
estimation
expectation
Fahrenheit
fast, faster, fastest
fathom
feet
foot
fulcrum
furlong
gallon
giant
goals
graduated cylinder
gram
graph
growth
gymnastics
gyroscope
half-pint
heat
heavy, heavier, heaviest
height
hot
inch
inch worm
ingredient
inner ear
instrument
intermission
Kelvin
kilogram
kilometer
large
length
light, lighter, lightest
line (of a play)
line of symmetry
liquid
liter

long, longer, longest
major (scale)
marathon
mass
measure
measurement
measuring cup
measuring spoon
medium
mercury
meter
metric system
metronome
midget
mile
millimeter
minor (scale)
mobile
notation note
ounce
perimeter
pint
pound
precision
pygmy
quart
recipe
rod
ruler
scale
scene
short
size
sketch
slow, slower, slowest
small, smaller, smallest
speed
spring scale
syllable
symmetry
symmetrical
T-square
table
tall
tape measure
temperature
tempo
thermometer
time signature
ton
treble
unit
visual balance
volume
warm
weigh
weight
wide,width
yard
yardstick

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SPACE UNIT

SPACE UNIT

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SPACE UNIT

Background Information

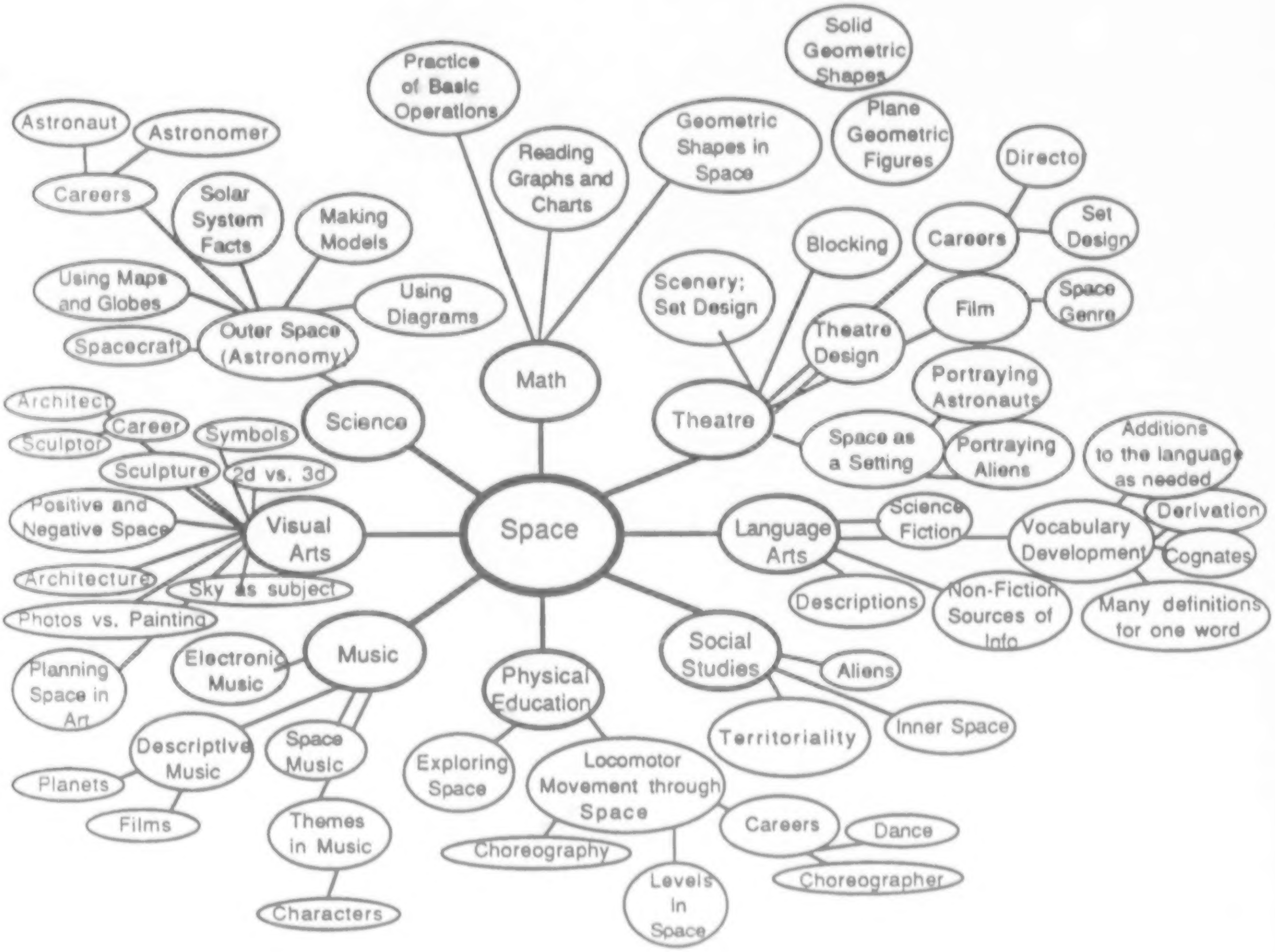
This unit attempts an interdisciplinary approach to "space". Its premise is that the word "space" has many definitions and usages.

The space unit is traditionally taught as "outer space" or astronomy. Yet other topics (included in this unit) are possible. Architecture, choreography, and the visual arts all use space as a design element. The architect suits the space to the function it will serve; the choreographer tells the dancers how, when and where to move in space. Space in the visual arts refers to the positive and negative aspects of the design and their placement on the page (or canvas). Another way to think about the word "space" is its mathematical context; in that regard, space is the setting for geometry and geometric figures enclose it. "Inner space" refers primarily to the personal region of the mind and reminds us that all of us need territorial space as well.

By including many and varied activities from many subject areas, the teacher encourages her students to develop concepts across the boundaries of traditional subjects. An integrated approach facilitates creativity (divergent thinking) as well as reinforcing knowledge (acquired through convergent thinking). The juxtaposition of the diverse definitions of this term gives both breadth (horizontal enrichment) and depth (vertical enrichment) to the courses and allow students to generate original relationships and ideas.

The fascination which space holds for all children will be a powerful motivator for even the die-hard underachiever. Additionally the significance of this unit to children's study of the future cannot be denied. In conclusion, this unit can (and should be) many things to many people. It offers the opportunity for extended study by the children and creative extensions by the teacher.

Visual Organization of Topics


Space
Science
Outer Space (Astronomy)
Careers
Astronaut
Astronomer
Solar System Facts
Making Models
Using Maps and Globes
Using Diagrams
Spacecraft
Math
Practice of Basic Operations
Reading Graphs and Charts
Geometric Shapes in Space
Solid Geometric Shapes
Plane Geometric Figures
Theatre
Scenery; Set Design
Blocking
Theatre Design
Careers
Directo
Set Design
Film
Space Genre
Space as a Setting
Portraying Astronauts
Portraying Aliens
Language Arts
Science Fiction
Vocabulary Development
Additions to the language as needed
Derivation
Cognates
Many definitions for one word
Descriptions
Non-Fiction Sources of Info
Social Studies
Aliens
Inner Space
Territoriality
Physical Education
Exploring Space
Locomotor Movement through Space
Choreography
Levels in Space
Careers
Dance
Choreographer
Music
Electronic Music
Descriptive Music
Planets
Films
Space Music
Themes in Music
Characters
Visual Arts
Architect
Career
Sculptor
Symbols
Sculpture
2d vs. 3d
Positive and Negative Space
Architecture
Sky as subject
Photos vs. Painting
Planning Space in Art

Short Term Objectives

Language Arts

1. The student will give many definitions for the word "space".
2. The student will increase his reading vocabulary by 50 words.
3. The student will complete at least one creative writing assignment.
4. The student will participate in word games, puzzles, and riddles.
5. The student will participate effectively in at least 2 discussions.
6. The student will explain the difference between science fiction and non-fiction books.
7. The student will correctly categorize science fiction and non-fiction 80% of the time.
8. The student will recognize space jargon, acronyms and synonyms in the space vocabulary list.
9. The student will relate either Latin roots or Spanish cognates for the terms lunar, solar and terrestrial.
10. The student will listen attentively to guest speakers and classmates 80% of the time.

Mathematics

1. The student will improve his accuracy and speed in basic operations by practicing with space-related software.
2. The student will name the following plane and solid geometric figures: circle, square, triangle, rectangle, sphere, cube, pyramid, triangular prism, rectangular prism.
3. The student will define space as the setting for all geometry.

Music

1. The student will recognize themes for characters in a piece of music.

2. The student will distinguish between acoustic and electronic music.

3. The student will demonstrate musical creativity by: writing a song or song lyrics, creating a radio play from background music or conducting/composing in one of the unit's activities.

4. The student will play or explore freely the makeshift instruments (or real instruments) provided.

5. The student will sing in class 80% of the time.

Physical Education (Dance)

1. The student will correctly perform the basic locomotor movements (rolling, creeping, crawling, walking, running, skipping, hopping, jumping).

2. The student will generate variations on the basic locomotor movements.

3. The student will explore new spaces confidently.

4. The student will follow directions to limit the space in which he moves.

5. The student will move expressively to musical accompaniment.

6. The student will participate in group activities 80% of the time.

Science

1. The student will recognize planets, moons, stars and asteroids from photographs and explain the differences between them.

2. The student will name the nine planets (in order).

3. The student will use the words in the general vocabulary list correctly 80% of the time.

4. The student will use maps, charts, globes and models correctly.

5. The student will demonstrate or tell the difference between rotate and revolve.

6. The student will define constellation and give an example.

7. The student will explain (or show using models) the meaning of axis and eclipse.

Social Studies

1. The student will explain the terms "inner space" and "territoriality".

2. The student will explore and share his feelings about alien life form.

3. The student will explore and discuss people or things she values.

4. The student will recognize that others have differing values.

Theatre

1. The student will convincingly portray an astronaut or an alien.

2. The student will role play in at least 2 creative dramatics situations.

3. The student will move in character in at least one activity.

4. The student will explain the job of the set designer and define "blocking" and "scenery".

Visual Arts

1. The student will correctly identify a piece of sculpture.

2. The student will be able to differentiate between two-dimensional and three-dimensional art.

3. The student will use 70% of the following new words correctly in an artistic context: sculpture, circle, ellipse, sphere, sketch, collage, model, concentric, 2-d, 3-d, architect, space, construction.

4. The student will explain what an architect's job is.

5. The student will explore various media for depicting skies or heavenly bodies.

6. The student will produce at least one 3-d work (android, rocket, space station).

7. The student will produce at least one 2-d work (alien, planet, constellation).

8. The student will demonstrate visual awareness or visual memory for sky or cloud appearance.

9. The student will relate an attribute of a two-dimensional representation (e.g. size) to a three dimensional product (solar system model).

10. The student will participate in group imaging exercises or individual imaging exercises.

11. The student will experiment with the use of "space" in his artwork.

12. The student will show the difference between positive and negative space.

Field Trip Ideas

1. Visit the office of an architect, a landscape architect, or an interior designer. Emphasize careers, sketches and models.

2. Visit spaces designed for a particular purpose (stadium, aquarium, coliseum, natatorium or auditorium). Discuss how their function dictated how the space would be used. (Discuss Latin roots of these words.)

3. Visit spaces that elicit various feelings (top of a tall building, inside a small, enclosed space, in the middle of a football field, in a crowd). Discuss the feelings. Comment how other places (e.g. school) make one feel.

4. Visit the nearest planetarium or NASA space facility.

5. Visit a sculptor at his studio or visit a sculpture exhibit at a museum. Use discussion questions afterward to elicit personal reactions to the pieces of sculpture.

6. Visit a library (school, public or university) to see what materials are available for further study of astronomy, architecture, or choreography.

7. Visit a scene shop for a local theatre group. Watch scenery being built or let children act on a set for a real production. Visit backstage to see how the set looks from the rear.

Speaker Ideas

1. Invite an older child who enjoys science fiction to share his favorite author or book.

2. Invite the manager of a store which sells robots to demonstrate his products.

3. Invite a person who has been to a NASA launch to tell about it and show slides.

4. Invite an older student who has been to NASA's space camp at Marshall Space Flight Center to share his memories. (See bibliography entry on Space Camp.)

5. Invite a high school student who builds model rockets to explain the process.

6. Invite an artist to do a demonstration of how he draws or paints the sky.

7. Invite an amateur astronomer to demonstrate the use of a telescope and/or star charts.

Bulletin Board Ideas

"How Many Mouths Does a Martian Have?"

Display (not too-grotesque) pictures of aliens from magazines such as OMNI or from science-fiction book jackets. Encourage students to create their own alien for the next week's bulletin board.

"Skies Aren't Always Blue"

Display photos or paintings in which the sky is an unusual color. (Calendars of impressionist paintings are wonderful.) Encourage children to observe sky color at sunset and to describe it or draw it in pastels.

"Lost in Space" -- A Bulletin Board Game

Older students can make up the game (rules and all) for younger students to play. The board is a laminated map of the solar system Children design spaceships for game pieces. Adventures are drawn from a stack of cards. (Great practice for space geography!)

"Mrs.________________'s Space Cadets"

This is a display of self-portraits (perhaps given as homework). Children should draw themselves dressed as astronauts and having a space adventure. (The teacher should contribute a self-portrait as well.) This artwork is an excellent starting point for creative writing activities.

Snack Suggestions

1. Serve Chef Boyardee UFO's and discuss UFO's while eating them.

2. Chocolate pudding in a baggie - (Similar to space food in pouches. Seal it with tape then put a small slit in one corner to open when ready).

3. Anything dehydrated (as the first space food was) that the children can reconstitute.

4. Have the children make up a menu for a space station restaurant. Include items like "Martian meatballs". Choose one dish from this menu to prepare for snack. Let the students write the recipe, cook it and eat it.

5. Jupiter cookies (see p. 54)

6. Planetary pizza (see p. 54)

7. Eat the solar system after you've discussed it (see p. 60)

Parent Letter

DATE:________________________

Dear Parents:

This month's unit of study will be space. We will be learning about astronomy (outer space), architecture (designing space), sculpture (3-dimensional forms of art) and dance (moving through space.) If we have time we will also cover some psychology (inner space).

You can strengthen the lessons presented at school by doing some of the following activities at home with your child.

1 - Take your child stargazing one night.

2.- Talk about any experiences you have had relating to astronomy (such as seeing Halley's comet.)

3 - Dance with your child or play movement games (like Twister) that promote the child's awareness of her body in space.

4 - Find a large appliance box to be converted into a space ship for his room and help him decorate it

5 - Watch a space adventure show or movie with her and talk about her future (possibly in space!)

If you have any books or other teaching materials at home that concern "space", I would greatly appreciate your sharing them with us for this time. As always we welcome your suggestions about this unit and encourage classroom visits.

Sincerely,

Colleague Letter

DATE___________________

Dear Colleague;

We're changing units again! My class will be starting an interdisciplinary study of space next week. We will cover mostly astronomy, but will also study architectural space, space as an element of art (sculpture, dance) and the "inner space" of the mind.

Attached are several ideas which you may find useful for integrating our space unit into your regular classroom activities. If you would like to plan some joint activities with us for all or part of your class, please let me know. I'd welcome the chance to work with you more closely.

As always, I would appreciate your ideas and suggestions. Please let me know how our "shared"students are doing in your class and if I can be of any help by sharing materials.

Thanks again for all your cooperation.

Sincerely,

Related Activities
For the Regular Classroom

1.Language Arts Activity: The Planet of Circ
Emphasis: Creativity (fluency)

An imagery exercise about a planet on which the king has decreed that all objects must be circles. Discussion of what would be allowed in various categories (such as food) possibly followed by art activity. (Circular pieces of drawing paper generate excitement and originality) See next page for a sample story.

2. Art Center: Sculpture Emphasis: Creativity (Visual Arts)

Supply small cardboard boxes, throwaway plastic objects, styrofoam shapes, toothpicks, wires, pipe cleaners, tin foil, etc. at a clasroom center for making a 3d construction. (A parent volunteer to help with fastening pieces is helpful.) Follow construction with a "Space Sculpture Show" (perhaps in the library). Encourage children to choose space sounding names and a different home planet (e.g. John Mroki from Xenon XII) to sign their works.

3. Dramatic Play: Moon Outpost
Emphasis: Creativity (Role-Playing)

Provide a pretend space area for creative dramatics with space station, astronaut helmets and uniforms, alien masks, etc. These space props can also be used for improvisations or skits.

4. Free Time Reading Table: Science Fiction
Emphasis: Leisure Reading

A display and reading area for enjoying popular paperbacks, comic books, or audio tapes such as StarTrek, ET, Star Wars, etc.

The Planet of Circ

Once upon a time a very long time ago, there was a planet named Circ and a king named King Circ I. Now ordinarily, people would say the "King Circ the First". But some people, being rather dull, would read it "King Circ L". Well, King Circ the First or Circ L (whichever you like) was a very round fellow. He had a round face with jolly round eyes and very round cheeks.. (Unfortunately he was rather overweight.) He had a very round and prominent tummy. Almost everything about him was rounded. Even if you tried you couldn't find a straight line or an angle anywhere on him.

Well, to make a long story short (or to get round to the point) the king thought that round was beautiful.. He loved round things of all kinds, circular or spherical items of any size or color. And the people, who loved him dearly even though he was pudgy, made round things to please him. In fact, after a time almost everything on planet Circ was circular; and what wasn't circular was spherical.

The king liked all this circularity so well, he made a royal decree. Everything on the planet had to be a circle or a sphere. Any item not circular was to be put into a giant rocket and sent into space.

[Here let children finish the story either on their own or as a group project. They can . . .

a) then illustrate the story.
b) generate lists of things which could stay on Circ and which would have to go!
c) design rounded things to replace the banned items (i.e. a circular car?)]

Play Group Ideas

1. Have all the children bring popoids, construx, capsela, or space legos for an afternoon of "Cosmic Construction". Take pictures of all creations.

2. Make a playday for all Star Trek, ET or Star Wars toys. Encourage students to come in costume (but beware of light sabre fights). Encourage synthesis of the casts -- what would happen if the Enterprise chased the Milennium Falcon?

PRE-TEST:

1. How many planets are there? ____________________

2. Name as many planets as you can. ____________________

____

3. Do all planets have moons? ____________________

4. Which planet has the most moons? ____________________

5. Where is the asteroid belt? ____________________

6. What is our faimly of planets called? ____________________

7. Is the sun a star? ____________________

8. Is a meteor a star? ____________________

9. Which planet has rings? ____________________

10. What is an orbit? (Can you draw one?)

Exploratory Activities

Language Arts/Exploratory Activities

1. **Poems about Heavenly Bodies.** Provide a folder or notebook of poems written about the moon, sun, stars, etc. Leave blank pages in the back for children.to add to the collection. Encourage illustrations.

2. **Corrections.** Display on a posterboard or bulletin board some nursery rhymes with "cosmic mistakes". (See below). Allow the children to play teacher by crossing out the "wrong" words in red pen and correcting the rhyme.

   EXAMPLE: Hey diddle diddle, the cat & the fiddle,
   The cow jumped over Neptune.
   The little dog laughed to see such fun,
   And the dish ran away with the moon.

3. **Space Jokes.** Start a space joke collection. Provide books of jokes and riddles which the students can skim to find others. Discuss puns and homonyms when appropriate.
   EXAMPLES:

   Did you hear about the new restaurant on the moon? Yes, it has great food but no atmosphere.

   Did you hear about the astronaut who hurt his foot in space? Yes, he got missile-toe.

   Did you hear about the spacecraft that lost power? All the astronauts were sitting in the dark! Yes, they had to send out for a satel-lite.

   Did you hear about the almond who went into space? Yes, he was the first astro-nut.

4. **Can you guess?** On the first day of the week, post this sign. "My very excellent mother just served us nine pizzas." Wait

for a reaction. If the students don't catch the significance of the sentence, smile and say nothing. Next day, underline the first letter of each word; again wait for a reaction. On the third day, give this clue: MVEMJSUNP. On the fourth day, ask "How many letter (or words) are there?" On the fifth day, give up and tell them that its a mnemonic device for remembering the planets' names in order.

5. Put out circular paper at the writing center or supply table. Show children how to write in a circle along the outer edge of the paper, spiraling inward. Encourage the children to write (anything they like) and to swap and read each others' work when finished.

6. Provide story starter sentences and/or shape booklets for creative writing. (Space shuttles are popular.) Strange-looking writing instruments (like mechanical pencils or the Pilot Precise V5 pen) add interest. Story starter examples:

   Once, when I was on Pluto . . .
   I just discovered a new planet and I named it . . .
   In the year 2010, I traveled to Jupiter to investigate . . .

7. Give the students a vocabulary list from this unit and ask them to make a crossword puzzle or find-a-word puzzle. (This is most easily done by giving them a scrabble game to plan with). Print it and distribute it to them (for proofreading) and then give it to their regular classes for fun.

8. Leave flashcards out with all of the vocabulary words for this unit written on them. Encourage children to use them in pairs for practice.

Mathematics/Exploratory Activities

1. Provide stencils or templates of the plane geometric shapes for tracing.

2. Provide wooden or plastic 3-d models of solid geometric shapes.

3. Display a poster of plane or solid shapes and their names. Try to include all the unusual names as well as the more common shapes.
   Example: 12-sided = duodecahedron

4. Provide paper patterns for older children to use in assembling solid shapes.

5. Provide various kinds of protractors and compasses for experimentation.

6. Encourage sorting games especially for 3-d shapes. Example: Place many everyday objects into a bag. Label parts of the table or counter "cylinders", "rectangular prisms", "triangular prisms", "spheres", etc.

7. Provide geoboards and rubber bands.

8. Supply tangram pieces and puzzles.

9. Supply blocks which allow the construction of 3-d shapes which do not have right angles.

10. Supply puzzles or games which require the assembly of 2-d and 3-d figures.

Music/Exploratory Activities

1. **How space affects sound.** Play the same instrument (or tuning fork) in different places, at different distances from the listener. Explore how space affects sound in buildings (acoustics). Give the students tuning forks to explore resonation.

2. Listen to & read lyrics to songs which have heavenly bodies as subjects. Examples:
   "Sun in the Morning & the Moon at Night"
   "You Are My Sunshine, My Only Sunshine"
   "Twinkle, Twinkle Little Star"
   "Moonlight Sonata"
   "Music of the Spheres"

3. **Electronic keyboard experiments.** Encourage students to experiment with a keyboard which plays different instrumental sounds, rhythms, attacks or accompaniments.

4. **The Music of the Spheres** (or a planetary xylophone). Collect nine metal objects of varying sizes (cooking pots, mixing bowls). Arrange them in a solar system and play planetary music. Invent notation (perhaps using letters from the planet names) to write the score. Borrow a cymbal for the sun!

5. **A radio improvisation.** Play music softly and let students improvise a radio play. (The first section of Holst's Planets evokes many ideas!) The script (if written) should be suggested by the music's characteristics. Tape the results for sharing if the performers wish.

6. **Alien Choir**. Choose five children to be aliens. Each can make only one sound. The sixth child can be the conductor/composer. As he points to each alien, the alien must make his sound. (Be prepared for bizarre squawks and squeaks.) Encourage the conductor/composer to try different tempos and combinations of sounds. Swap roles so everyone gets a chance with the baton.

7. **Space Kazoos**. Issue kazoos and allow the students to play along with the StarTrek theme or 2001 theme (Also Sprach Zarathustra). Encourage unison and part playing.

Physical Education/Exploratory Activities

1. **Group Project**: Create a space obstacle course (using borrowed P.E. equipment or the playground). Allow the children to set it up and make the rules for crater-hopping, etc. Encourage them to use their imaginations to elaborate on the space scene. A prize for all who make it through the course might be a specially designed official "space cadet" badge, laminated and hung from a yarn necklace. (Use clip art provided.)

2. **Group Project**: Create a tunnel maze by taping all sizes of cardboard boxes together (at least 20-30). Have the children spend time maneuvering through crawl spaces, getting stuck, finding directions, pretending they are underground at a space colony repairing it, etc. (If they wish, let them make a map of it.)

Science/Exploratory Activities

1. Display lunar maps, a lunar atlas and a lunar globe.

2. Display material from NASA and books or articles on the astronauts, the space shuttle, etc.

3. Display a celestial sphere and/or a mechanical model of the solar system.

4. Allow students to see transparencies from space units designed for older children (i.e. Miliken series) by using an overhead projector themselves. If an overhead is not available tape the transparencies to a window.

5. Display various globes -- earth with and without political boundaries, a topographic globe, a globe without longitudinal or latitudinal markings.

6. Display various pictures of earth taken from space. Mark those showing "earthrise", "earthset" and "full earth".

7. Group project: Provide a solar system bulletin board or mobile kit. Allow the children to read directions, punch it out, assemble it and hang it themselves. Provide technical assistance if needed, but not leadership.

8. Hang 3 or 4 space posters (low on the wall) showing galaxies, nebulae, etc.

9. Supply a VCR with a selection of NOVA tapes or NASA films.

Social Studies/Exploratory Activities

1. Display pictures of astronauts living and working in space. Include both U.S. and Soviet examples.

2. Display movie posters or ads and a caption which read, "Do You Want to Meet an Alien?" Note: Be sure some of the aliens are friendly, such as E.T.

3. Display (or put in a notebook for browsing) cartoons about aliens. At the end of the book include a list of thought-provoking questions. Examples: Is there and alien somewhere looking at a book of human jokes? What on earth seems strange to aliens? What on earth seems strange to you? What can we learn from these cartoons?

4. Display (or put in a notebook for browsing) pictures of science-fiction characters and situations. Note: fan magazines are one source of these photos. Beneath each picture put a question. Examples: What is she thinking? Is he afraid?

Theatre/Exploratory Activities

1. Guessing game for acting partners. One student chooses a card on which is written something like this:
    a) Walk like a robot.
    b) Slither like a slime monster.

   He acts it out. The second student then looks at the list of ten possibilities and guesses what the first is student doing. If he guesses correctly, it is then his turn to choose a card. If he does not guess correctly the first student can continue the movement or try a new card until he suceeds in guessing correctly.

2. If a parent will make costumes or if Halloween costumes of Star Wars characters are available, allow students to role play parts of the movie. Encourage the invention of new adventures.

Visual Arts/Exploratory Activities

1. Have children paint several planets using circular matte cutouts as the surface (available from any framing store); display while drying. Label planet name (real or imaginary) on the back with artist's name.

2. Provide body parts cut from magazines (and paper and glue) for children to design aliens. Encourage collages or mixed media representations of imaginative beings.

3. **Group project**: Provide clay of various colors for children to use in creating a solar system (ours or an imaginary one). Allow them to mix colors to create visual effects similar to real planets' appearances.

4. **Group project**: A mural of the night sky can be produced by using a long piece of black or dark blue board paper and various sizes and colors of gummed stars. For some children, re-creating known constellations will be fun; for others creating new constellations will be a priority. Display overhead if possible.

5. Provide cardboard boxes, tubes and sheets for construction of robots and androids. (Tape, butterfly clips and a stapler are also needed). After the children are finished, ask a parent to help spray them. (Silver spray paint is popular!) Display if possible in a robot sales room.

6. **Group project**: Let several students create a space station or space port from plastic scraps and throwaway items. (Elmer's craft glue and model paint also are needed). Plastic astronaut figures can be added as well. Encourage children to elaborate on the functions of the structures they design.

7. Make lite-brite sheets from black construction paper. Mark on each the principal stars of a constellation. Let a child make the constellation with the light pegs and then try to guess its name or shape. (Creative children can generate new constellations for you to guess.)

8. Provide cookie cutters which are concentric circles or concententric stars for clay play.

9. **Group project**: Make a giant sculpture of styrofoam spheres, hemispheres, and circles. These can be held together by toothpicks or popsicle sticks depending on the size of the spheres. Decorate with glitter if desired and display. (If you do this activity near Christmas, the sculpture can be dismantled and made into ornaments!)

Guided Activities

Language Arts/Guided Activities

1. Take turns describing aliens. As one student gives a description, the others can close their eyes and visualize the being. If time permits, children can then draw the alien just described. Emphasize fluent use of language, complete descriptions and careful listening for details.

2. Discuss a future time when there may be hotels on the moon and children can go on vacation there. (See Bibliography for related title by Blumberg). Have the children brainstorm what activities might be there for the tourists. Then ask them to write home about what they have been doing on their trip. (See pages 28 and 29 for moon motel stationery.)

3. Discuss the etymology of the terms solar, lunar, terrestrial. Spanish-speaking pupils will relate the words "sol", "luna", and "tierra". Have students look up sun, moon and earth in other languages if translating dictionaries are available. Mention the derivations for the days of the week also. Extend the lesson for older children by learning the words terrestrial, territory, lunatic, solarium, solstice, etc.

4. Leave scrambled vocabulary words on the magnetic board for re-spelling (1st day: sun, star, Saturn, space; 2nd day: moon, Mars, meteor, Mercury; 3rd day: rotate, revolve, rocket, retro; 4th day: asteroid, astronaut, astronomy, atmosphere.)

5. Space travel has added many words to the language. Discuss the concept that new words are invented to a language when needed. Some of these groups of words can be taught using a pocket chart.

    a) Synonyms: launch-lift off;
    astronaut- cosmonaut;
    landing - splashdown;
    lunar rover - moon buggy.
    b) Acronyms: UFO; NASA
    c) Space Jargon: A-OK; spinoff.
    d) Old words taking on new meanings: docking; port.

Let the children list words from Star Trek, Star Wars, etc. that people now use but which name imaginary items (i.e. ewok, wookies).

6. Give practice in reading non-fiction sources for information. Paragraphs can be put on flip tablets for reading aloud. Review the skimming technique. Contrast the speed and accuracy of pleasure reading and reading for information. With able readers, use inference questions as well.

7. With older children, show how the date of publication affects the information within. Give every child a different reference book or non-fiction book. Ask each to find the answer to the same question: How many moons does ____________ have? Ask for a hypothesis why the books do not agree. After discussion, show them where to find publication dates.

8. Science fiction vs. science: Bring various reading materials to class and ask children to sort them into appropriate groups for two display tables you are planning. Review the difference between science fiction and non-fiction. Vote on whether each item is fiction or nonfiction. After a vote, discuss why children disagree. Clarify the distinctions. (Examples: Star Trek comic book, fiction account of a journey to the moon, book of astronomy facts; paperback of ET, etc.)

9. Use a flannelboard or pocket chart to put together words found in the vocabulary list for this unit. Stress root words and endings. For younger groups use word changes that are regular; for older groups stress exceptions to the rules.

Examples: astronomy/astronomer;
planet/planetary/interplanetary;
nebula/nebulae; galaxy/galaxies;
circle/circular; sphere/spherical;
manned/unmanned;
weight/weightless/weightlessness;
Mars/Martian; Jupiter/Jovian;
rotate/rotation;
revolve/revolution;
fiction/non-fiction;
sculpt/sculptor/sculpture;
hydrate/hydrated/dehydrated.

10. Talk about the many non-fiction sources of information about space. Children may be able to brainstorm some of these; if not, list several and show examples of each. Display them in a libary corner for browsing. Examples: books, magazines, encylopedias, atlases, almanacs, filmstrips (non-fiction), films, etc.

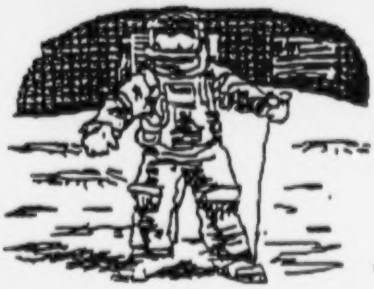
11. Talk about the many diefinitions of the word "space"; if this activitiy comes near the end of the unit, have children recall activities that you did relating to each of these definitions. An extension of this activity is to post or read definitions of "space" and have the children make a sentence for that definition. Example: "an enclosed area"; "I do not have enough space for my books in my closet."

12. Write the words on a chalkboard. Ask students to explain what each is.

    Map, Chart, Diagram, Model, Globe, Atlas, Graph.

    If the students cannot exactly find the right words to do so, put out an example of each and see if they can match the word to the object. Then try to generate a definition of each. If they still have trouble, give them a page of definitions and see if they can match the definiton to the word. Give as much help as necessary. As an extension of this lesson, ask students to discuss why a map is useful sometimes, but a globe should be used at another time. Help them articulate the exact purpose for each. Then give a situation and see if the children can tell you which of these should be used. Example: A fisherman off the coast of Louisian is looking for a particular island. What should he use?

13. Read Thurber's Many Moons to the children. Talk about the different people's concepts of the moon.



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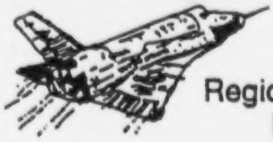

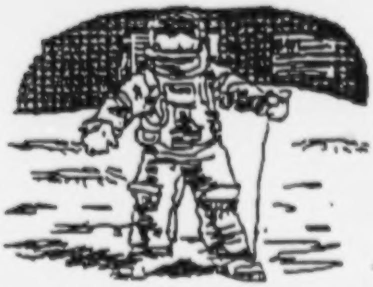

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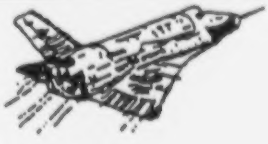


Mathematics/Guided Activities

1. Count planets or moons. (Occasionally leave one out so the children can identify which is missing.)

2. Use ordinals to identify planet placement in the solar system

3. Use software: Alien Counter (Milliken); Alien Addition (DLM); Minus Mission (DLM); Meteor Multiplication (DLM).

4. Solve story problems using a space scenario. (Example: Three astronauts weighing a total of 420 lbs. went to Mars. They used 1/2 their fuel to get there. The trip took them 7 days. If the distance between the two planets has gotten shorter since their launch, do they have enough fuel to get home?)

5. Compare the size of planets and compare distances between them for interplanetary travel.

6. Group planets by attribute (gaseous ones, ones with moons etc.)

7. Construct 3d models of rockets or spacecraft from 2d diagrams.

8. Read graphs which compare planetary characteristics (i.e. maximum temperature, number of moons). See page 31.

9. Construct a solar system model or a mobile for practice in using ratios (for planet diameter and/or distance from sun).

10. Use a calculator to generate a table of comparative weights for the students choosing various planets or moons of residence. (Variations: Use student weights in kilograms; invent aliens & their weights.)

11. Talk about the year 2000, 2001, 2010. discuss with the children how the earth existed before the year 1. (B.C. and A.D. can be show on a timeline effectlively. Discuss years B.C. as negative numbers.) How old will they be in the year 2000? Will they be out of school? If children in your class multiply, ask them to figure out the number of weeks or days until January 1, 2000.

12. Talk about "space" as the home for all geometric figures. Which of these figures live in planes (2-d space) and which live in 3-d space? Points, lines, line segments, rays angles, squares, circles, triangles, cubes prisms, pyramids, etc.

EARTHLIKE PLANETS

Facts in Brief

	Mercury	Venus	Earth	Mars
Distance from Sun	36 million miles (58 million km)	67 million miles (108 million km)	93 million miles (150 million km)	142 million miles (228 million km)
Diameter	3,000 miles (4,830 km)	7,600 miles (12,230 km)	7,900 miles (12,710 km)	4,200 miles (6,760 km)
Orbital Speed	107,280 mph (172,610 km)	79,200 mph (127,430 km)	65,000 mph (105,000 km)	54,000 mph (86,890 km)
Length of Year	88 earth days	225 earth days	365 earth days	687 earth days
Length of Day	59 earth days	243 earth days	24 hours	24.6 hours

Note: A year is the time it takes a planet to make one complete revolution around the sun. A day is the time it takes a planet to make one complete rotation around its axis. (All astronomical measures are approximate.)

Source: Berger, Melvin. (1978) Planets, Stars and Galaxies. NY: G.P. Putnam's Sons.

MAJOR PLANETS

Facts in Brief

	Jupiter	Saturn	Uranus	Neptune	Pluto
Distance from Sun	484 million miles (78 million km)	887 million miles (1,427 million km)	1,782 million miles (2,867 million km)	2,794 million miles (4,496 million km)	3,667 million miles (5,900 million km)
Diameter	89,000 miles (143,000 km)	74,000 miles (119,000 km)	32,000 miles (51,000 km)	30,000 miles (48,000 km)	3,600 miles (5,800 km)
Orbital Speed	29,310 mph (47,160 km)	21,700 mph (34,920 km)	15,210 mph (24,480 km)	12,080 mph (19,440 km)	10,520 mph 16,920 km)
Length of Year	12 earth years	30 earth years	84 earth years	165 earth years	248 earth years
Length of Day	10 hours	10.25 hours	10.75 hours	16hours	6.4 earth days

Note: A year is the time it takes a planet to make one complete revolution around the sun. A day is the time it takes a planet to make one complete rotation around its axis. (All astronomical measures are approximate.)

Source: Berger, Melvin. (1978) Planets, Stars and Galaxies. NY: G.P. Putman's Sons.

Music/Guided Activities

1. The Planets by Holst is a musical composition which consists of movements for each of the planets The class might:
    a) listen to one planet's music each day to start class as the teacher shows pictures of the planet.
    b) read about the mythological figure each planet depicts and then dance the character (Mars & Mercury are favorites for this).
    c) paint a space scene while listening to this composition.

2. "Music from the Hearts of Space" is a public radio show which features "space music" (sometimes called "atmospheric music"). (Play lists and order blanks can be obtained by calling 1-800-87-ORBIT and space music collections are also available at larger music stores. Play several selections of space music for the students to work by and then ask them to comment on it. Did they like it? (Give reasons.) Why do you think its called "space" music? How did it make you feel? Can you think of a time when it would be good to listen to this? Of a time when you wouldn't like it? What kinds of instruments are these? Could you make up words to this song? (Space music is also excellent as a background for guided imagery and relaxation exercises.)

3. The Star Wars album is a good choice for motivating students not usually interested in music. You can teach the concept of a theme in music used to represent a character (Luke, Leia and Vader all have a theme). Ask them to listen to several cuts, identifying the theme for each character. What emotion do they feel for each theme? Let students improvise a dance for each character trying to show in their movements, his or her attributes (e.g. Darth Vader is sinister, mean, threatening, evil).

4. **"Moon Music"**. Play several selection with moon in the title or lyrics. "Clair de Lune" - "That Old Devil Moon" - "Moon over Miami" - "The Man in the Moon is a Lady" (from Mame) - "Blue Moon". Ask students to compare and contrast them.. Introduce terms such as tempo, style, mood, etc. (If you can get two

versions of "Blue Moon", the older romantic version and the 50's version, the students are sure to hear the difference).

5. Making up a song about the planets helps the students remember their names in order and, of course, promotes creative expression. Students also easily generate nonsense songs about space travel.. You can provide melodies or let them compose their own.

6. Synthesizers and other electronic instruments may be the "music of the future". Listen to electronic music and emphasize:

   a) awareness of the sounds of electronic music;
   b) understanding how it is produced and
   c) discussing its effect on the listener compared to live, acoustic music.

7. Show the Stardust album by Willie Nelson. Talk about his appearance and his "outlaw" image. Listen to cuts such as "Stardust", "Blue Skies", "Moonlight in Vermont", and "On the Sunny Side of the Street". Is his music what you would expect, judging by his appearance? Talk about "country" and "popular" music. An extension of this activity is to sing some of these songs. A "Willie Nelson Lyric Book" for readers is helpful.

8. Talk about music in films. Why is it used? How does it help tell the story? What can music express? Play excerpts from science fiction films which help communicate an emotion or give a description. Discuss the job of the composer in creating a "score" for a movie.

Physical Education (Dance)/Guided Activities

1. In order to teach the relationship between space and movement, give the students a limited space in which to move by:

   a) putting large matte board cutouts on the floor and asking them to move within the space outlined by the board.

b) giving each a cardboard box in which to dance; swap boxes so the children can contrast the effect of small, medium & large movement areas.
c) outlining different shapes and areas on the floor with tape. Ask the students to perform various movements within this space. What limitations does space put on movement?

2. Take several days to practice the basic locomotor movements (rolling, creeping, crawling, walking, running, jumping, hopping, skipping, galloping) and variations of each. Promote fluency by introducing types of walks (moon walk, walking backwards, walking on your hands, walking toe-to-heel, walking tiptoe, etc.) and then having children design a movement (the Mike-walk, the Ann-walk) for others to copy.

3. Create unusual movement situations to help children develop kinesthetic memory and transformation skills. Group activities might include:

   a) trying to move through an imaginary bowl of jello if the jello is up to your ankles; up to your knees; up to your waist;
   b) being a piece of spaghetti in a pot of water. Start stiff and then get limp. Change movements as the teacher turns the fire up! The finale is a pot of boiling water! (Remind them that they are moving in a confined space.)

4. Teach levels of movement through space by restricting movements for dance. In Dance #1, the rule is that your torso must always be in contact with the floor. Dance #2 requires one or more limbs to touch the floor at all times (no hops or jumps, etc.). Dance #3 requires that you touch the ground as little as possible. Encourage them to use the space above the floor by hopping, jumping, leaping, etc. Rest and discuss the limitations of each of the dances. Which did they like best? How did each dance feel? In which dance did they work the hardest (fighting gravity)?

5. (View tapes of moonwalks if possible.) How does it look when people walk on the moon? Can we move as if we are weightless while we are here on earth? Why or why not?

Encourage experimentation in moon wlaks and slow-motion movement as well.

6. **Explain body sculptures**. Let each child create a sculpture using the bodies of the other children. Take turns being the sculptor. Take pictures of each creation from several angles so the participants can see how they looked. On the next day, show several examples of mobiles. Let the children create mobiles from the other students' bodies. After the mobile is designed, the sculptor can then blow very hard and set the mobile in motion.

7. Making geometric shapes in a plane and in space can be accomplished using children or children and yardsticks. Show the children geometric solids or models made of drinking straws. Have children make a triangle by lying on the floor; then try making a pyramid or a triangular prism. Repeat the activity with squares, cubes, rectangles, rectangular prisms, etc. Ask them to do a circle and a sphere and then discuss the problem of making curves with bodies.

8. Discuss the job of choreographer. (He tells the dancers when, where and how to move through space.) Let each child choreograph a part of a longer dance. Encourage them to use as much space as possible, both vertical and horizontal. After doing the dance, ask whether the dancers used all the space in the room? Which parts of the room were not used and why?

Science/Guided Activities

1. Put plaster of Paris in a pie plate. When it is semi-hard, drop marbles into it to create craters. Have children experiment with the size of marbles, the distance and speed of descent and the force of impact. Relate to craters on the moon.

2. Have the children act out "rotate" and "revolve". With partners, they can take turns being a) the earth rotating; 2) the moon revolving around the earth; 3) the earth rotating and revolving around the sun. Then talk about putting the moon's and the earth's motions together. (The moon will have to work very hard to stay close to the earth as it revolves around the sun.)

3. Once those concepts (rotation and revolution) are established, you can build a human solar system and put it in motion. Use colored tape to mark off orbits on the gym or cafeteria floor. (You, as teacher, may be the sun.) Assign the students as planets and moons and set them spinning at an appropriate speed. If you choose, you can also pick larger students for the larger planets and you can ask the students to wear the correct color, etc. Caution: Jupiter has so many moons that it is unwise to use all of them. They tend to get dizzy and run into each other!

4. Prepare a chart or table on posterboard with information missing. Ask each child to find the answer for one box. An example is listed below. (Compare answers as the answer given may depend on the source used.) The difficulty of the question should depend on the experience the children have had with reference books and library skills. Simple charts can be constructed even for non-readers so that they can experience the visual organization of information.

PLANET NUMBER	NAME	COLOR	MOON
1	Mercury		No
2			No
	Earth	Blue	
4		Red	

5. As a group, create a solar system model or mobile. (See pages 64, 65 and 66 for ideas and dimensions.)

6. Compare pictures taken of earth from outer space to a globe with countries depicted in different colors. Show the children a globe without marked boundaries for countries. If possible show them a globe with relief markings. Compare and contrast all these representations of earth. Find the area in which they live on each globe. Discuss the use of 2-dimensional maps and atlases versus 3-dimensional globes.

7. Lunar maps and a lunar globe (if available) offer good practice in transforming 2-dimensional and 3-dimensional information. Have students work in pairs or teams to find various locations on the map and the globe.

8. Explain the difference between a meteor and a meteorite. Show pictures. If possible, see one.

Social Studies/Guided Activities

1. **"If I went to the Moon, I'd surely take..."** Spaceships are crowded places because of all the supplies and equipment aboard. However astronauts are always allowed to take a few small personal belongings. What would you take and why?

2 **"The Challenger Disaster."** On January 28, 1986, the Space Shuttle Challenger exploded shortly after liftoff killing her crew of seven. Discuss the feelings of the people involved; discuss the causes of the accident; discuss good things which have come about as a result of the tragedy.

3. **Taking Risks and Conquering Fear**. (If possible, rent a videotape of 2010 and show the segment in which the American and Russian travel together to the disabled space vehicle.) Topics for discussion:

    Trusting people you work with
    Trusting yourself
    How your body reacts when you're frightened
    Joint U.S./Russian Space missions
    Having friends to support you when you are afraid

4. **Alien Exchange** - Each student has agreed to have an alien live with him for one year. The situations on page 40 involve social problems which might result. Have one child react to each problem. Then ask for additional ideas from the rest of the class.

5. Write a week's journal about traveling in space. Each day write (or dictate) something that happened to you on your space journey. Include exciting, happy, scary, proud, angry, bored and lonely feelings.

6. **Define territory**. Explain what it means when a biologist calls an animal teritorial. Where is your territory? Is it your room at home? Where are you always safe? Where is your best stuff kept? Ask children to tell about animals (or people) who guarded their territory? What do people do if you invade their territory? How much territory do you need? Extension: Stake out territories in your room for a week. Be prepared to deal with border disputes, annexations, alliances and wars. On Friday deal with the "land is power issue".

7. Explain the concept of "inner space". Ask the students to lie quietly and visit this space. Explore the freedom of inner space created by your own imagination. Ask them to transform their inner space (through imaging) to
   a) a desert.
   b) a frozen wasteland.
   c) a quiet peaceful place.
   d) a noisy hectic place.
   e) a happy place.

   Remind them that control of that inner space is theirs alone.

Alien Exchange Scenarios

1. You take your visiting alien to the park to play baseball with your neighborhood friends, but trouble develops when choosing up teams. Since the alien has three arms, he will have a better chance to catch the ball in the outfield The other team doesn't want to let him play on your team because they say you will have an unfair advantage. What do you do?

2. Your alien sits down to supper the first night with you and your family. He calmly puts the drinking straw up one nostril and drinks milk through his nose. What do you do?

3. Your alien goes to school with you but gets into trouble the first day. (He corrected the teacher on several facts about space travel and was sent to the principal's office.) What do you do?

4. You take your alien to a shopping mall and he immediately spends all his money to buy flowers. Then he tries to give these flowers away to strangers in the mall. Some take them; some politely refuse; some are rude. How do you explain their behavior to him?

5. Your alien says a traditional holiday on his planet is "FWDRKDOP DAY"; on this day everyone on his planet eats snails and dances the snail dance. He asks you to celebrate with him. What do you do?

6. Your alien is very confused by his visit to the zoo. He asks why you keep animals in cages. What do you say?

7. The alien wants to sleep from 12 midnight to 4 A.M. and play games for the rest of the night (This alien needs little sleep). Your mother says he must go to bed at 8 P.M. like everybody else. "You are a growing alien and need your rest," she says. What do you do?

8. You discover that your alien has the power to disintegrate anything. What do you do?

9. Your alien, after 3 weeks with you, is very homesick and asks to leave Earth. What do you do?

Region VII E.S.C.
McCallister

Theatre/Guided Activities

1. **"Astronaut Applications Taken Here."** Role-play the scenario of a personnel manager at NASA choosing new astronauts for a Mars mission. Interview the students who want to apply for the job. Questions might include: Why do you want to go to Mars? What qualities do you have that would make you a good astronaut? How would you feel about being away from you family for so long? What experiences have you had so far that would help you on this mission? Have you ever considered the danger involved?

2. **Partner Role Play**: You have just found a being from outer space in your backyard. You cannot speak his language. He cannot speak yours. Convince him that you are friendly and find a way to communicate.

3. You all are the crew of a spaceship, but the spaceship is damaged and cannot be repaired. You might be able to make it back to earth, but there are fuel supplies for ONLY 4 of you. How will you choose which 4 will live and what will you do with the rest of the crew? Assign roles and improvise.

4. Theatre have been arranged in many years over the centuries. Show floor plans from several eras in history. Talk about the relationship of the audience to the actor and the job of the architect in designing an auditorium, "a place for hearing". Talk about thrust stages, arena stages, proscenium stages and theatre-in-the-round.

5. **Introduce the term "blocking".** Directors "block" the actors' actions in a play. They tell them when to move and when to stay still. Use the analogy to choreographer and dance. Explain that directors are responsible for the stage picture just as artists are responsible for their art work's composition. (If possible show photographs of porductions and point out the director's visual composition.) Choose any scene and "block" it. Tell a pair of actors where to stand as they say their lines. Take the smae scene and block it differently with a second pair of actors. (Contrast the effect of actors close and actors far apart on the stage.)

6. Explain the job of the set designer. Show photographs and sketches for the scenery of several plays. (Textbooks on set design are most useful.) Explain that the set designer creates a structure (if only make-believe) for the characters to live and work in. Stress that set designers are somewhat like architects but that their creations are short-lived. Ask children to draw sets or make models for a story they all know. Share designs.

Visual Arts/Guided Activities

1. Libraries often have paintings or prints which can be checked out. Choose a different one each week for display in the classroom, especially those with interesting treatments of the sky. Spend five or ten minutes each week discussing the painting with the children. Notice line, color, texture (if possible), shape, forms, movement, media. What feeling does it evoke? Do the children like it enough to hang it in their houses? What was the artist trying to say when he drew or painted it? Encourage them to try some of these ideas in their art work.

2. Explain imaging and imagery to the students if they are unfamiliar with it. Do the imagery exercise called "Weightlessness". (See page 38.) Then allow them time to draw or paint afterward. They may need to be reminded that the figures in the pictures need not be standing. Encourage unusual body positions and orientations.

3. Share a book on impressionism with the class. Tell about the major impressionist painters as you show their works. Emphasize their unique ways of painting the sky. Paintings deserving special attention are:

Renoir - Pont neuf, Paris,
Renoir - Coastline at Antibes
Monet - La seine a Giverny
Monet - Woman with a Parasol
Monet - Argenteuil
Van Gogh - Starlight over the Rhone
Degas - The Races
Sisley - Meadow
Sisley - Timberyard at Saint-Mammes
Signac - Entrance to the Port of Honfleur
Seurat - Seascape at Port-En-Bessin, Normandy

4. Show paintings and photographs of planets. Talk about the difference between a drawing or painting and a photograph. Discuss the value and purpose of each. (Stress that art need not be realistic as some of the children who are strongly perfectionistic will not like their work unless it is has photographic realism). Ask children to discriminate between photographs and other works in a practice set of magazine pictures or book illustrations.

5. Review the difference between a circle and a sphere. Explain 2-dimensional (length & width) vs. 3-dimensional objects (length, width and height) art. Ask whether a painting is 2-d or 3-d. Show them a small piece of sculpture and ask, "2-d or 3-d"? Emphasize that to enjoy sculpture we walk around it and see it from all sides. Demonstrate (by turning the piece) that it looks differently depending on your point-of-view. Ask if that is true for drawings and pointings as well. Define sculpture and emphasize it as a 3-d art form.

6. Seeing the sun through various artists' works may help students give up (or at least modify) their usual symbol ☼ . The art text, Another Look by Mary Townley, contains a wonderful section on the sun in the Level A books. Some of the works in this section (which you may find elsewhere) are:
    Turner - Yacht Approaching the Coast
    Lippold - Variations Within a Sphere, No. 10: The Sun
    Townley, Hugh - Quiet, Sun
    Burchfield - Sun and Rocks

Stress that the sun appears differently at different times, in different places and to different people; the usefulness of a symbol is therefore limited to expressing the general idea of sun and doesn't convey a complete description of the sun. Encourage experimentation with sun paintings giving the children many tints, shades, and tones of yellow and orange with which to work. (Caution: Remind children not to look directly at the sun.)

7. Show and share pictures of the various planets and have the children try to identify them by color (red for Mars) or some outstanding characteristic (Saturn's rings or Jupiter's spot). Encourage observation, description, comparison.

8. Explore how position and distance affect our perception of objects. Have children a) view the same object from several distances away; b) view the same object from 2 different perspectives. (A ball, half-red and half-yellow makes a good example; so does a pyramid which has a square bottom and triangular faces.) Talk about the size of and distance to the moon. How does earth look from the moon?

9. Talk about "concentric". Show concentric figures or puzzles. Talk about concentric designs on fingerprints, tree rings. Talk about orbits being concentric ellipses. Mention orbits for electrons. Have the children start with a line (closed curve is easy) and make concentric closed curves until the page is filled. Add color if time permits.

10. Talk about the symbols that man (especially young children) use for the heavenly bodies. Ask the children to draw sun, moon and star symbols. Talk about the usefulness of symbols and then illustrate other symbols for astronomical and astrological objects. (See Clip Art.) Discuss why symbols are sometimes not appropriate in art. Example: the sun doesn't really look that way so in a realistic painting, the symbol could not be used.

11. Talk about the lives of several recent sculptors and show pictures of their works. Giant sculptures are intriguing for this purpose.

12. Ask the students to imagine that they are architects for the first colony on the moon. They will each design one building for the colonists to live, work or play in while they are inhabitants of the moon. Generate a list of structures needed and their purposes. Ask each to do a sketch, diagram or model of the building they will be responsible for. For older students, ask them to take into account gravity, temperature, atmosphere, and homesickness for earth. What materials would you build it from? How would you get those materials from the earth up there?

13. Show several examples of children's work (from art texts, not the current class) in which the artist did or did not use the entire surface of the paper. Ask the children in each case if the artist used some, most or all of the space in an interesting way. Then show art works by well-known artists. Emphasize their use of every available part of the space to give the viewer a complete or interesting visual message. Ask each child to create a work using all or most of the available space in an interesting way.

14. Talk about positive and negative space in art. (The easiest way to show this difference is to use design or composition texts.) Explain that positive space is the "something" that's painted and that negative space is the "nothing" around it. (Portraits are the easiest example of this.) Have the students draw something. Cut it out. (This is the positive space they used.) Paste it on another background. Can they see the negative space? It may be the same shape as the leftovers of the first sheet of paper. (It would be different if they pasted the object in another place on the 2nd paper.) Show pictures which balance positive and negative space.

15. Ask students to plan the space for their next drawing or painting. Demonstrate how to do this by:
    a) Arranging and rearranging felt design pieces on a felt board;
    b) Using a glue stick to attach design pieces on to poster board; peel them off and rearrange them into another design; repeat.

    Ask for a sketch or plan before the child's next work.

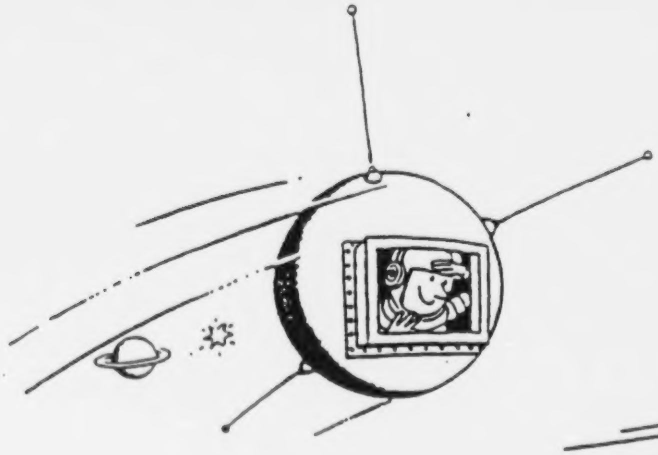
Guided Imagery

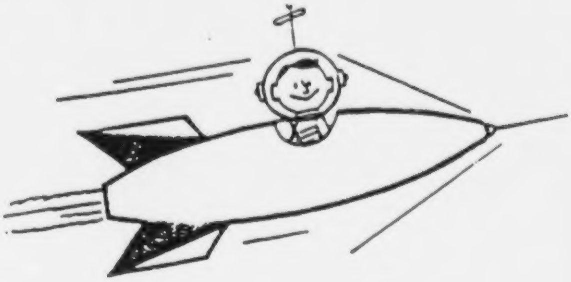
Weightlessness

Imagine yourself inside a spacecraft, buckled into your seat. You are an astronaut. See yourself in an astronaut's uniform. You are in orbit around earth. If you look out the window of your capsule, you can see the earth like a big blue marble below you. Now it's time to be weightless. See yourself unfasten the buckle on the straps that restrain you. You slowly rise weightless out of your seat. Don't move yet; just float. See yourself unsupported, floating above the chair. Relax and enjoy the feeling of floating. You are beyond earth's gravity; nothing pulls you down. You can stay mid-air in the cabin if you like. Feel the sensation in your body. How does your stomach feel? Now you can begin to move around. Try some movements. See yourself - you seem to fly. You move without much effort. Your legs don't need to walk. Swim through the air. You can bounce off the ceiling if you like. See yourself turn and twist in the air. Hang upside down for a while if you like. Visualize yourself trying all sorts of different body positions. Enjoy the freedom. (You know you can't fall.). Try a somersault or a cart wheel. Handstands are easy here. Now slow down & just rest for a moment. Stay very still until your motion stops. Slide or sink back into your chair. Pull yourself back down into it. Its time to strap in and get back to work now. Call Space Central in Houston and tell them how it felt.

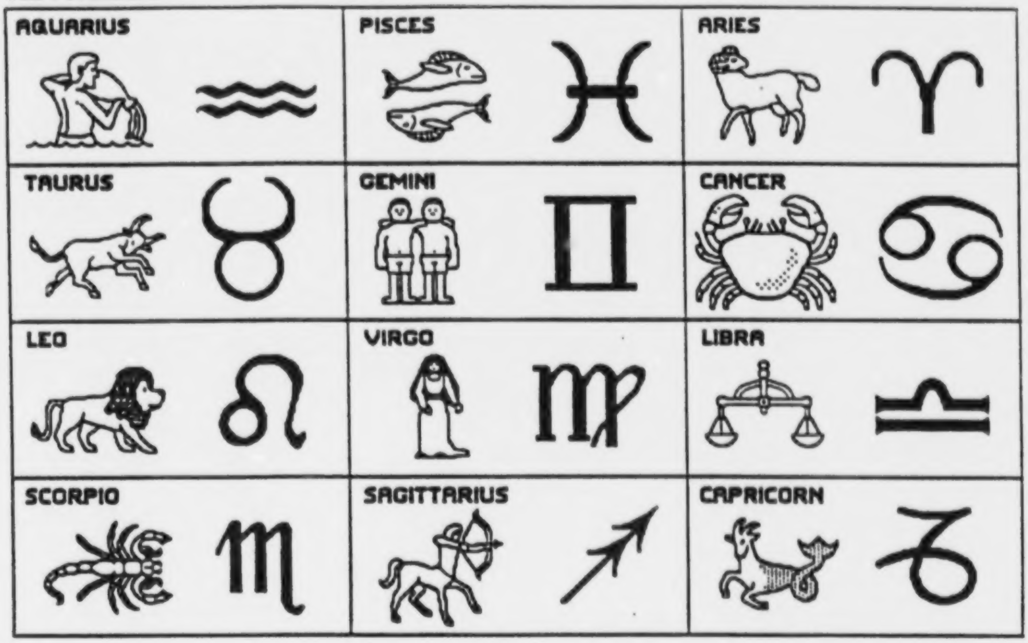
Free and Inexpensive Teaching Resources

Teacher Resource Center Lyndon B. Johnson Space Center Mail Stop: AP-4 Houston, TX 77058 (713) 483-8696 or -8619	Catalogs Available: Teaching materials can be ordered by phone or mail. (Allow at least 2 weeks for delivery.) Films can be duplicated there but are not sent out. Educational programs are available during the school year at Johnson Space Center.
NASA/Johnson Space Center Public Service Branch AP-4 Houston, TX 77058 (713) 483-4321	Talk to the scheduler for basic group tours of 25-30 students.
(713) 483-4241	Talk to this office for tours requiring special arrangements.
Young Astronauts Club P.O. Box 65432 Washington, D.C. 20036	Information on starting chapters.
Space Camp Alabama Space & Rocket Center One Tranquility Base Huntsville, AL 35807	Brochure on student programs
Educational Affairs NASA Headquarters Washington, D.C. 20546	Information on new resource materials and about ongoing programs are available.
McDonald Observatory P.O. Box 1337 Fort Davis, Tx 79734 (915) 426-3263	Call or write for an educational packet. ($9.95)





ASTROLOGY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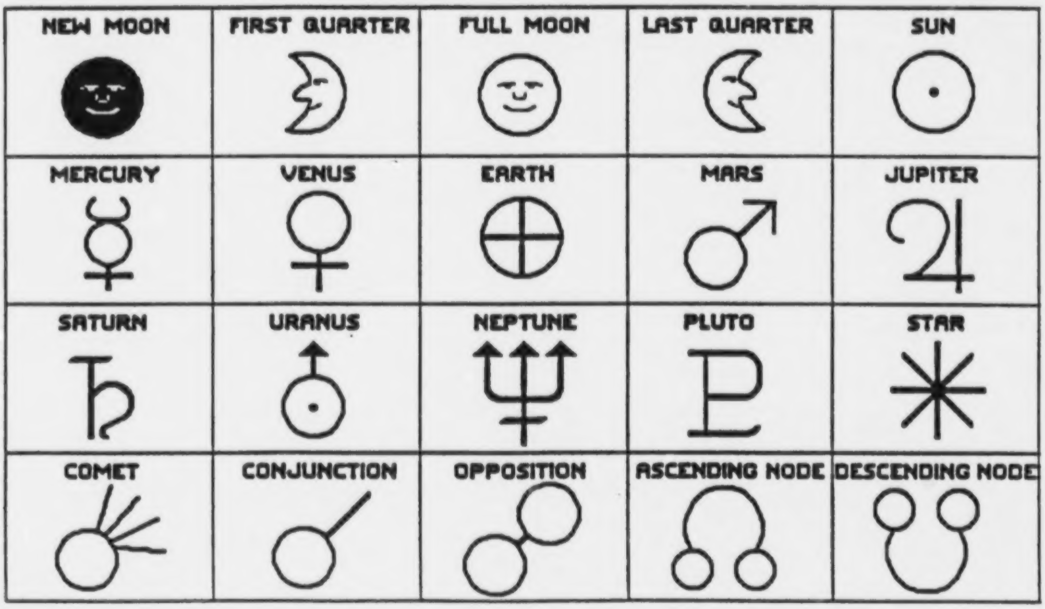
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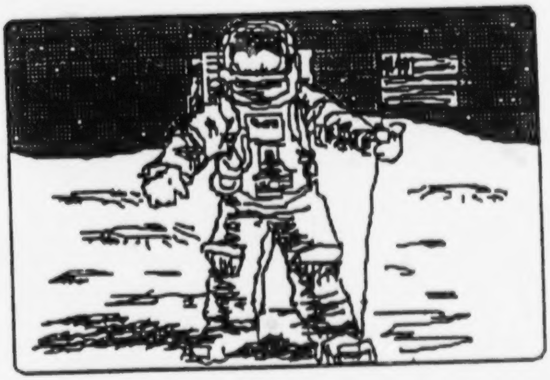

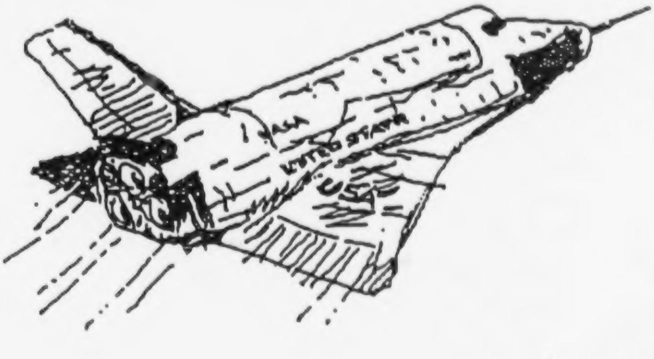
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Questions & Topics for Independent Study

Topics for Independent Study

1. The Sun
2. Any planet: report on characteristics
3. Any planet: report on mythological figure for whom it was named
4. Meteors and meteorites
5. Halley's comet
6. Any constellation: find the story behind the name
7. Manned Space Flight: Mercury, Gemini, Apollo, Skylab, Space Shuttle
8. The design of the space shuttle - inside and out
9. Any astronaut
10. Earth's moon
11. Black holes
12. Quasars
13. Satellites
14. Animals in Space

Note: See bibliography for suggested books.

Questions for Library Searches

1. Most of the planets are named for gods and goddesses from mythology but earth is not. How did earth get its name?

2. What is escape velocity? What speed is it in miles per hour? Does escape velocity vary from place to place on the earth?

3. Why is Jupiter's red spot red? What makes Jupiter's stripes?

4. How long would it take you to get to Pluto if you could travel a million miles a year?

5. Which unmanned mission went to Mars? What did it discover?

6. Why can we sometimes see a face in the moon?

7. What is another name for the "North Star"? Why is it important? What is an astrolabe?

8. How does an astronaut take a shower in space?

9. Explore the possibility of people living on the moon in a colony. What have other people written (or drawn) about it?

10. Who is George Lucas? Tell about his work.

11. What are UFO's? What evidence exists to prove that they have visited earth?

12. What is the zodiac? What is the difference between astronomy and astrology?

Closure Activities

1. Make "Jupiter" cookies to be shared during class, perhaps with an oral report on Jupiter. ("Jupiter" cookies are sugar cookies painted with food dye before baking. Children should copy both the stripes and the giant red spot characteristic of Jupiter.)

2. Planetary Pizza provides a lunch for several gifted/talented classes together. Use pepperoni for planets, olives for moons, chopped mushrooms for asteroids. (Use a large cafeteria baking sheet.)

3. A robot tour of your gifted/talented classroom can be given to invited guests when space projects are on display. (Students should make their own robot costumes and adopt a "robot" personality.)

4. A science fiction film festival using VCR tapes can show the evolution of a single character (e.g. Buck Rogers) or of the evolution of special effects in cinema. (Also a great money-raiser if other classes participate.)

5. Make a list of all the careers which you have discussed in the unit. Review the jobs and the attributes of people who are successful in these careers. Ask children to choose one of these careers and talk about why they would or would not like to pursue it.

6. How can we communicate to another person what Mars is like? Review the ways in which children learned about Mars during the unit. Talk about the various ways to convey information or impressions about an object. Review Mars as described in music, as shown visually, as described in words (prose or poetry) or as danced. Create a product or performance for another class which teaches about Mars.

Unit Evaluation

Evaluation of the student's progress may include but not be limited to:

1. Achievement of short term objectives regarding participation and products.

2. Satisfactory ratings on Skills Checklists designed for the subject area.

3. Completion of culminating product or performance (individual or group) requiring synthesis of major concepts taught.

4. Gains on the pre and post test using Torrance's "Thinking Creatively in Action and Movement", particularly the first pretest, "How Many Ways?"

5. Adequate score on a teacher-made test .

6. Successful interview of student (oral or written) about his learning performance.

Vocabulary List

2-dimensional
3-dimensional
A-OK
acoustic
acronym
altitude
auditorium
alien
android
aquarium
architect
architecture
asteroid
astronaut
astronomer
astronomical unit
astronomy
atmosphere
attribute
axis
blastoff
blocking
capsule
Challenger
chart
choreographer
choreography
circle
circular
cognate
collage
comet
concentric
constellation
construction plan
cosmonaut
countdown
crater
cube
dehydrated
description
diagram
dimension
director
discovery
disintegrate
distance
distant
Earth
eclipse
enterprise
electronic
ellipse
exploration
fiction
fuel
galaxy
gas
geometric figures
globe
gravity
heavenly body
hemisphere
horizon
impressionism
inner space
interplanetary
jargon
Jovian
Jupiter
Latin
launch
levels (of movement)
liftoff
light year
limb
locomotion
locomotor
lunar
lunar rover
map
Mars
Martian
Mercury
meteor
meteorite
mobile
model
mood
moon
movement
NASA
natatorium
nebulae
Neptune
non-fiction
orbit
outer space
painting
perspective
photograph
plane
planet
planetarium
planetary
Pluto
pyramid
rectangular prism
revolve
robot
rocket
rotate
satellite
Saturn
science fiction
sculptor
sculpture
set design
set designer
shuttle
sketch
sky

solar
solar system
solid
space
space music
space shuttle
space station
space travel
space vehicle
spacecraft
spaceship
sphere
spherical
spin
spinoff
stadium
star
star chart
stargazer
style
sun
sunspots
symbol
synonym
telescope
tempo
territory
terrestrial
theme
torso
triangular prism
UFO
universe
Uranus
Venus
weight
weightless
weightlessness
zodiac

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SPACE UNIT

APPENDIX A

Cycle Around the Solar System

Do you know how big the solar system is? It's not hard to find out. All you need to do is to have one small scavenger hunt. And go on one long bicycle ride.

First the scavenger hunt. Look around and try to round up the ten items in this list. None of them is hard to find. An you can substitute any one with another item, as long as it's round and about the same size. Here's the list:

A Solar System Salad

One fresh pea (the kind you eat)
One walnut
One slightly larger walnut
One dried pea (the kind you plant)
One bean
One Cabbage (about 9 inches across)
Another Cabbage (about 8 inches across)
A big orange
One grapefruit
Another bean (smaller than the first)

Put all the items in a bag or basket. Stick a bookmark in this page so you can take the book along. Hop on your bicycle and head for the nearest empty, school football field. You, your bike, your book, and your bag of goodies are going to take a little trip around the solar system, to find out how big it really is. See you at the track.

A football field (100 yards) and an oval track (440 yards are two standard units of measure found almost anywhere in the United states. but instead of going around a football field on a boring old track, imagine that you are speeding through the solar system.

At this scale, each yard you travel is equal to 211,265 real miles in space. Bet you've never ridden a bicycle that fast before!. If you start on the track at the football goal line, you'll be past the sun by the five yard line.

You'll briefly stop at each planet as you reach it. At each stop, drop off the planet from your bag of goodies. Mercury's pea, Venus's walnut . . . and so on. Notice after the first lap-and-a-half, you've gone through half of the solar system - the terrestrial planets, or the hard ones with a surface you could walk on.

The Terrestrial Lap

Mercury is a fresh pea at 36,000,000 miles or 2/5 lap.

Venus is a walnut at 67,200,000 miles or 3/4 lab.

Earth is a bigger walnut at 92,956,524.4 miles or one lap.

The *Moon* is a dried pea, one step away.

Mars is a bean at 142,000,000 miles or 1 1/2 laps.

Rest briefly after Mars, but not too long, because you've only started your journey! Next are the Jovian planets - mostly big and very far away. After you reach Saturn, stop and eat the peas, walnuts and cabbages. You'll need all the energy you can muster to get to Pluto.

The Jovian Lap

Jupiter is a nine-inch cabbage at 484,000,000 miles or 5 1/5 laps.

Saturn is an eight-inch cabbage at 886,000,000 miles or 9 1/2 laps.

Uranus is an orange at 1,780,000,000 miles or 19 1/5 laps.

Neptune 'is a grapefruit at 2,800,000,000 miles or 30 laps.

Pluto is a bean at 3,660,000,000 miles or 39 2/5 laps.

Why does it take less than two laps to go through the first half of the solar system and almost 38 more laps to reach the last know planet? Do you see why it took so long for earthlings to discover Uranus, Neptune, and Pluto?

The Astronomical Unit

Light years are too long to be useful in measuring the distances between planets, moons, and other objects in the solar system. Astronomers have chosen a more convenient unit of measurement for this purpose - the astronomical unit.

The length of one astronomical unit is the average distance between earth and sun. This distance is about 92,956,600 miles, but that doesn't matter exactly. The important thing is the ratio, or relative distances, between planets.

Using astronomical units the relative distances between the planets always stay the same, no matter if the distances are told in inches, centimeters, football fields, or actual miles. Here are the relative distances between the planets. They are told in astronomical units:

Mercury	.39
Venus	.72
Earth	1.00
Mars	1.52
Asteroids	2.33
Jupiter	5.20
Saturn	9.52
Uranus	19.16
Neptune	29.99
Pluto	39.37

Solar System Models

Do you have trouble remembering which planet is closest to the sun or fifth from the sun? If you make a model of the solar system, it will remind you how the planets line up.

There are many ways to make the model. And it can always be proportional - the way the planets are really placed in space - if you use the astronomical unit., Pick some unit of length that you're familiar with such as an inch, a football field, a mile, the distance from your home to a friend's

Let that distance be equal to one astronomical unit. Mark off that length on a piece of paper or something. Put the sun at one end of the line and the earth at the other. From there it's easy to figure out the spacings of the other planets by using astronomical units.

For example, if you picked one inch as you model astronomical unit, all the planets would be spaced like this:

Mercury	2/5 inch
Venus	3/4 inch
Earth	1 inch
Mars	1 1/2 inches
Asteroids	2 1/3 inches
Jupiter	5 1/5 inches
Saturn	9 1/2 inches
Uranus	19 1/5 inches
Neptune	30 inches
Pluto	39 2/5 inches

Pinhead Solar System

Here's one easy way to make a scale-sized solar system. Get a package of glassheaded pins, the kind people use for sewing. Pick the pack with the most variety of colors. If you look closely, you'll see that each pinhead is slightly different.

Pick one pin for each planet. Make your choices based on the color, shape, and "personality" of the planet. Let the bigger ones be Jupiter and Saturn and the smaller ones be Pluto, Mercury, and Mars.

If you choose one inch for your astronomical unit, you can make a solar system that will easily fit into you room. If you pick larger units, a foot or a yard a or a meter, you'll have to go outside to fit in Pluto and the other distant planets.

Source: Jobb, Jamie. (1977) The Night Sky Book, Boston: Little, Brown & Co.

SPACE UNIT

APPENDIX B

LOCATING THE CONSTELLATIONS

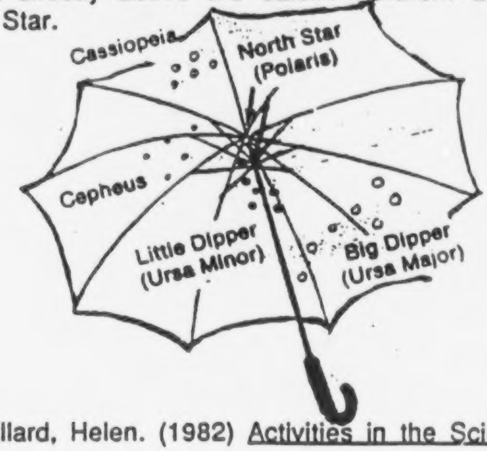
Secure a star map from a science journal or newspaper. Such a map is usually published monthly throughout the year.

Begin with the five constellations which appear to move around Polaris (the North Star). Secure a dark plain umbrella which can be drawn on with chalk. Draw the North Star around the very center of the umbrella, at the top of the handle. The North Star is at the end of the handle on the little Dipper. Follow the commercial star map, filling in the positions of the stars in the Little Dipper, Big Dipper, Cepheus, Draco, and Cassiopeia. Use lines to connect the stars for each constellation. You are ready to go out on a clear night and study the sky. Face north and locate Polaris and the rest of the Little Dipper. Hold the umbrella out in front of you and a little below your view of the five constellations. Turn the umbrella until it matches the patterns in the sky. You may need a flashlight to light up the umbrellas if the moon is not full.

DEFINITIONS

Constellation - any of nearly 100 arbitrary groupings of stars into real or fancied shapes: convenient for locating and identifying stars and other celestial objects.

Polaris - the bright star seen in the Northern Hemisphere that is almost directly above the earth's northern axis, also called the North Star.



Source: Challard, Helen. (1982) Activities in the Sciences. Chicago: Childrens Press.

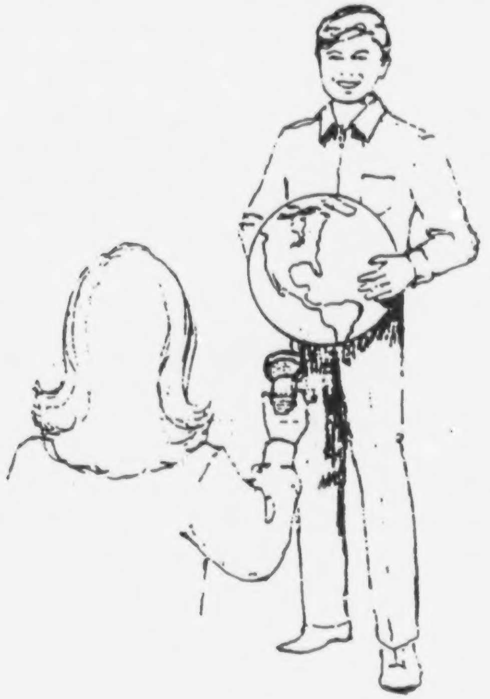
EXPLAINING DAY AND NIGHT

Have a partner stand several feet away from you with a flashlight (sun). Hold a globe (earth) with the axis pointing at 23° in the northerly direction. Be sure the light of the flashlight strikes the globe. Which continents are on the lighted side? Which countries are having night? Now slowly turn the globe counterclockwise. Watch the circle of light fall on other places while those on the opposite side are moving into the dark side away from the sun. Do you see why the sun appears to rise in the east and set in the west? Continue to experiment and figure out why some places have longer days or night than others do.

How long are the days and nights in your area? Secure data from the daily newspaper. Record the figures for sunset and sunrise over a period of several weeks or longer. Use a bar graph, black for night and white for day, to display the changes.

DEFINITIONS

Axis - an ideal line extending through the center of a body.



Source: Challard, Helen. (1982) Activities in the Sciences. Chicago: Childrens Press.

DEMONSTRATING ECLIPSES

You will need a light source, two Styrofoam balls (one must be about four times larger than the other), and two sticks. Sharpen one end of each stick in order to push one into each of the balls. Hold the sticks so that the small ball (moon) and the large ball (earth) are in line with the light (sun). You will need to vary the distances each one is held from the sun and from each other. Start moving the moon counterclockwise in an orbit around the earth. At what point is a shadow thrown upon the moon? If you are standing on the earth, where would the moon have to be in relation to you and the sun to have a lunar eclipse? Move the moon in its orbit until part of the sun's rays are blocked. This is a solar eclipse. Why don't we have an eclipse every time there is a new or full moon? What is the pattern of our orbiting moon?

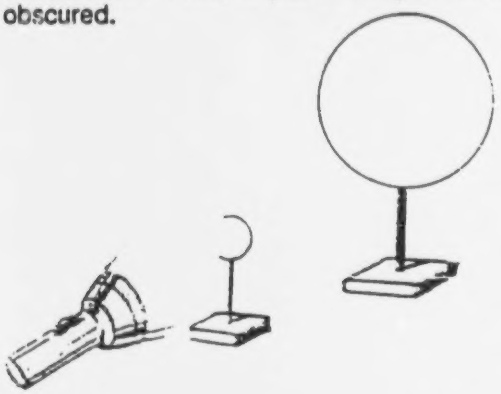
DEFINITIONS

Eclipse - a darkening of the sun, moon, etc. when some other heavenly body is in a position that cuts off its light.

Lunar Eclipse - an eclipse in which the moon near the full phase passes partially or wholly through the umbra of the earth's shadow.

Orbit - the path of any object as it revolves about some other object, whether it is the earth's path in revolving around the sun or an electron's path around the nucleus of an atom.

Solar Eclipse - an astronomical event occurring when the moon passes between the sun and earth, and the moon's shadow falls on the surface of the earth; a total eclipse occurs when the moon covers the entire solar area; a partial eclipse when only part of the sun is obscured.



Source: Challard, Helen. (1982) Activities in the Sciences, Chicago: Childrens Press.

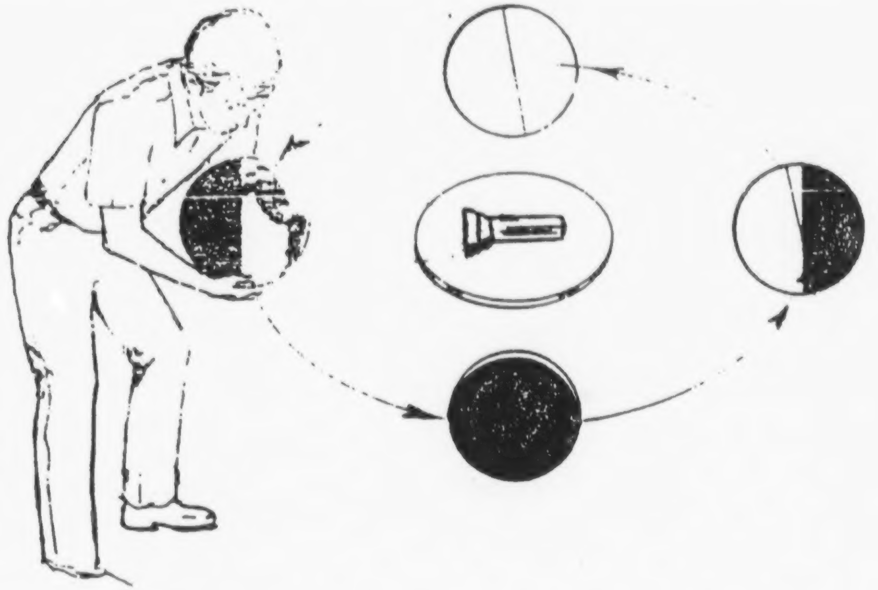
SHOWING THE PHASES OF THE MOON

Set a lamp without a shade on a table in a dark room. Stand several feet away from the lamp. Hold a ball out in from of you so it is in line with your eyes and the bulb of the lamp. The light is the sun, the ball is the moon, and you are on the earth. Now move the moon (ball) slightly to the left of the bulb. How much of the moon is lighted at this point? Turn on your heels so that the ball moves in a circle. At which point is there a full moon? A new moon? A quarter moon?

Now work with the real moon. Every three nights for one month diagram the shape of the moon that is reflecting light . Date your pictures. If a night is overcast, leave a space in your series of drawings. Can you fill in the empty spaces at the end of the month to show the phases of the moon that did occur on those cloudy nights? Does the moon rotate as well as revolve?

DEFINITIONS

Diagram - a graphic design that explains rather than represents.
Revolve - moving around another object.
Rotate - Turn on its axis; the earth's rotation produces day and night



Source: Challard, Helen. (1982) Activities in the Sciences, Chicago: Childrens Press.

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MAKING A STAR MAP

Cut a large circle out of a sheet of poster board. Divide it into twelve equal pieces as you would in cutting a pie. Moving clockwise, label each section with a calendar month from January to December. Along the outer rim of the circle mark off the days for each month. The map is now ready for charting the constellations as you locate them.

On the first clear night (mark the date on the chart) find an open area where the sky is visible down to the horizon. Face north and locate Polaris. Draw it on the very center of your circle. Fill in the rest of Ursa Minor (the Little Dipper) in the position as you view it. Let's say you are standing in Illinois on November 20. The Little Dipper would be in a position of spilling out. Look to the right and locate the Big Dipper (Ursa Major). Look below and a little to the left to find Draco. Cepheus will be about straight left in line with Ursa Minor. Lyra will be lower in the sky and to the left. Draw in only those constellations you are able to locate.

For greater accuracy draw in concentric circles ten degrees apart from the center out to your dateline. Then use an astrolabe to get the degrees of altitude above the horizon before you draw in a constellation.

Get a commercial star chart for your hemisphere. Compare your map with it. How far off were you on your rough methods of calculating?

DEFINITIONS

Altitude - height above a line used as a base; usually measured from a base of sea level, and expressed in feet and miles or meter and kilometers.

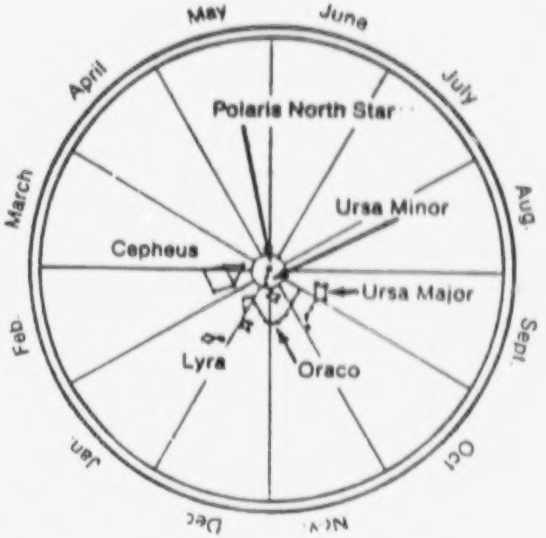
Astrolabe - an instrument that measures the exact altitude of stars, used in navigation and surveying; one type has a fixed altitude and depends on exact timing a star reaches that altitude.

Concentric Circle - a series of circles with a common center, as the ridges in fingerprints or a tree's annual rings.

Constellation - any of nearly 100 arbitrary grouping of stars into real or fancied shapes: convenient for locating and identifying stars and other celestial objects.

Hemisphere - half of a sphere, half of earth, as the Northern or Southern, Eastern or Western hemisphere.

Horizon - the line where the earth appears to meet the sky.


May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Jan.
Feb.
March
April
Polaris North Star
Ursa Minor
Cepheus
Ursa Major
Lyra
Oraco

Source: Challard, Helen. (1982) Activities in the Sciences. Chicago: Childrens Press.

BUILDING PLANET MODELS

In order to see the relationship of the size of planets and their relative distance from the sun, construct models to scale. The accompanying chart provides the diameter of the planets and the number of inches each model should be made when one inch equals approximately four thousand miles. Models made of papier-mache can be used. Shape each planet to the desired size and bake it in an oven for one-half hour. For each of the larger planets blow up a balloon to one inch less than the desired size. Mold a half-inch of papier-mache over the balloon and let it dry for several days.

The planets can be suspended by strings from the ceiling of a room. Arrange them in order form the sun by following the chart. Moons and other bodies may be added to make your solar system more complete.

PLANET	MILES FROM SUN (Distance)	SCALE #1 (In inches)	DIAMETER IN MILES (Size)	SCALE #2 (In inches)
Mercury	36,000,000	1.80	2,900	.75
Venus	67,200,000	3.35	7,700	1.95
Earth	92,900,000	4.65	7,920	2.00
Mars	141,500,000	7.10	4,215	1.05
Jupiter	483,300,000	24.15	85,700	21.45
Saturn	886,100,000	44.30	71,500	17.90
Uranus	1,783,000,000	89.15	32,000	8.00
Neptune	2,793,000,000	139.65	27,700	6.95
Pluto	3,670,000,000	183.50	3,600	.90

#1 one inch = 20 million miles
#2 one inch = 4,000 miles

PLANET	KILOMETERS FROM SUN	SCALE #1 (In centimeters)	DIAMETER IN KILOMETERS	SCALE #2 (In centimeters)
Mercury	57,900,000	5.79	4,667	4.667.
Venus	108,150,000	10.815	12,392	12.392
Earth	149,500,000	14.95	12,746	12.746
Mars	227,700,000	22.77	6,783	6.783
Jupiter	777,800,000	77.78	137,921	137.921
Saturn	1,426,000,000	142.6	115,068	115.068
Uranus	2,869,500,000	286.95	51,499	51.499
Neptune	4,494,000,000	449.49	44,579	44.579
Pluto	5,906,300,000	590.63	5,794	5.794

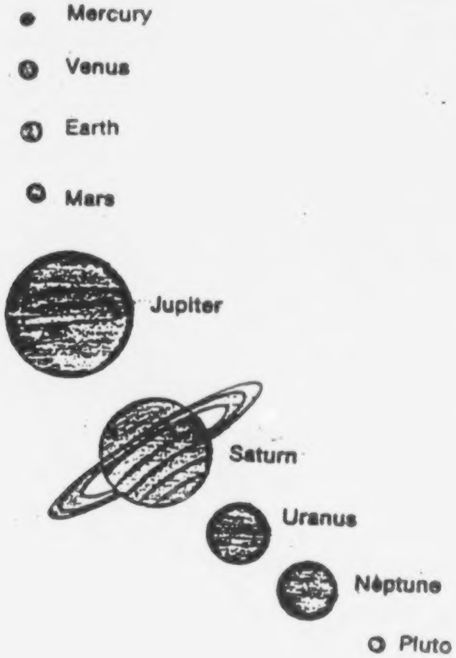
DEFINITIONS

Diameter - the length of a straight line through the center of an object.

Papier-mache - pieces of paper, usually newsprint, dipped in flour paste and hardens when dry; used for molding objects.

Planet - any of the nine opaque bodies, each revolving around the sun in its own orbit and also rotating on its own axis; shines by reflected light.

Scale - any series of graduated units used as a reference in measuring or an instrument showing the series.



Source: Challard, Helen. (1982) Activities in the Sciences. Chicago: Childrens Press.

CONSTRUCTING A CONSTELLARIUM

A Constellarium helps you to learn the star patterns in the sky before attempting to locate them in the dark. The following are a few of the constellations visible in the Northern Hemisphere at various seasons of the year: Big Dipper, Little Dipper, Orion, Perseus, Taurus, Cepheus, Cassiopeia, Hercules, Bootes, Draco, Gemini, and Auriga.

Cut out the center of a round oatmeal or ice cream carton lid. Leave a one-fourth inch frame around the edge. Cut several cardboard disks so that they fit tightly into the lid. Punch out a constellation pattern in each disk. Make larger holes for the brighter stars in each group. Cut a hole in the bottom of the carton just large enough for the bulb end of a flashlight to fit into it exactly. Put one of the disks with the pattern of a constellation on it into the lid of the carton and place the lid on the carton. Go into a dark room. Turn the flashlight on and the constellation can be projected onto a dark surface.

Have some friends make constellariums. Get together so each person can project a different constellation on the ceiling at the same time. Can you make the pattern of the night sky as it is normally seen around the North Star?

DEFINITIONS

Constellation - any of nearly 100 arbitrary groupings of stars into real or fancied shapes; convenient for locating and identifying stars and other celestial objects.

Northern Hemisphere - that part of the earth lying north of the equator.

Source: Challard, Helen. (1982) Activities in the Sciences, Chicago: Childrens Press.

DRAWING THE SIGNS OF THE ZODIAC

The Zodiac is a group of twelve constellations that appear to form a circle or band in the sky around and equatorial plane. In the Northern Hemisphere they are visible in the southern sky at different seasons. The circle is designated as 16° wide and at 30° intervals. Ancient people recognized each group of stars, except for one, as animals. Many myths were told about them. Here are the signs: Leo, Virgo, Libra, Scorpio, Sagittarius, Capricorn, Aquarius, Pisces, Aries, Taurus, Gemini, and Cancer.

To better understand and locate these constellations in the night sky, it is helpful to draw the star pattern of each on a large circle of tagboard. Put the sun in the center and the earth to one side with its moon. Use different-sized stars; a constellation often has a very bright star that is given its own name. Then use a series of dots to outline the object or animal it is supposed to resemble. Around the rim of the tagboard, label the months of the year and the time that each sign of the zodiac is visible where you live.

Do some research on the tales about the zodiac. Here is what you would learn about Pisces. It appears in autumn in the Northern Hemisphere. People thought it looked like two fish joined together at their tails by long ribbons outlined by stars. At the end the ribbons form a knot around a bright star. The whole constellation takes the form of an extended and straggling V. Can't you just see someone staring at the night sky, imagining what animal a group of stars look like? Try it yourself. Then see if your friends can spot your creature in the heavens.

DEFINITIONS

Constellation - any of nearly 100 arbitrary groupings of stars into real or fancied shapes; convenient for locating and identifying stars and other celestial objects.

Northern Hemisphere - that part of the earth lying north of the equator.

Zodiac - an imaginary circular belt in the heavens; includes twelve constellations that surround the solar system.

Source: Challard, Helen. (1982) Activities in the Sciences, Chicago: Childrens Press.

COMPUTER UNIT

COMPUTER UNIT

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COMPUTER UNIT

Background Information

Note: This unit is most suitable for 2nd graders but can be adapted for K-1 by reducing the number of independent activities.

After several interdisciplinary units, the children will have adapted to the class routine and will have become familiar with expectations and requirements, and hopefully will have adjusted emotionally and socially to the "gifted" class. Just before "routine" sets in, the savvy teacher will vary her classroom operations to renew interest. This study of computers, an awareness unit in which the students recognize computers and calculators as tools of learning, adds this variety. Additionally it allows students to gain expertise in choosing and planning their own work.

This unit has a slightly different format than the other units to enable teacher and students to change classroom procedures. Inserted into it are many opportunities for student input, independent work, and self-paced or contracted learning. The development of the child as an autonomous (self-directed) learner is stressed along with the content (computer skills/literacy). Evaluation of the students' performance (especially second graders') should include, therefore, not only a content test on the material covered but also a record of the child's progress toward autonomous learning. (See page 26.)

The following assessments will have to be made by the teacher to gear the unit to the level of her class. Before using or adapting the unit, please consider the following skill areas for each student.

a) Level of expertise in sequencing/logic activities;
b) Previous experience with computers (teacher-controlled or independent);
c) Eye-hand coordination for keyboarding skills;
d) Successful experience in or readiness for independent learning;
e) Planning and evaluation skills;
f) Motivation and reliability; and
g) Study and research skills for independent learning.

The subject matter of this unit is given in very general terms since many factors will determine the final form of this unit of study. Three factors which will impact on the choice of activities are 1) the variability of the school's computer resources; 2) the level of expertise of the teacher; and 3) the autonomy and computer knowledge of the students. Specific exploratory and guided activities are not listed for each content area as in other units. Because the emphasis is on student-directed learning, the students should generate and plan the activities as much as possible. General guidelines for activities are given, however, to help students generate ideas.

While the unit may seem shorter (in total pages) than other units in this curriculum, the actual time spent on it may be as long. Smaller schools with no computer facilities may choose to make this unit a short (2-week) introduction to computer technology. However larger schools with more complete computer labs and software collections may use a full month to explore not only the general theme of computer literacy but more specific skills as well (e.g. keyboarding). In either the two or four week version, however, the bulk of the students' time should be spent exploring the topic with as much direct experience as possible and with as much control over learning decisions as possible.

Generally, almost every school will be able to accomplish the major thrusts of this unit regardless of its resources. These thrusts are:

1) The exploration of the relationship between science, technology and society;
2) the use of computers for specific tasks at work and in school, including career awareness; and
3) the process of self-directed learning;

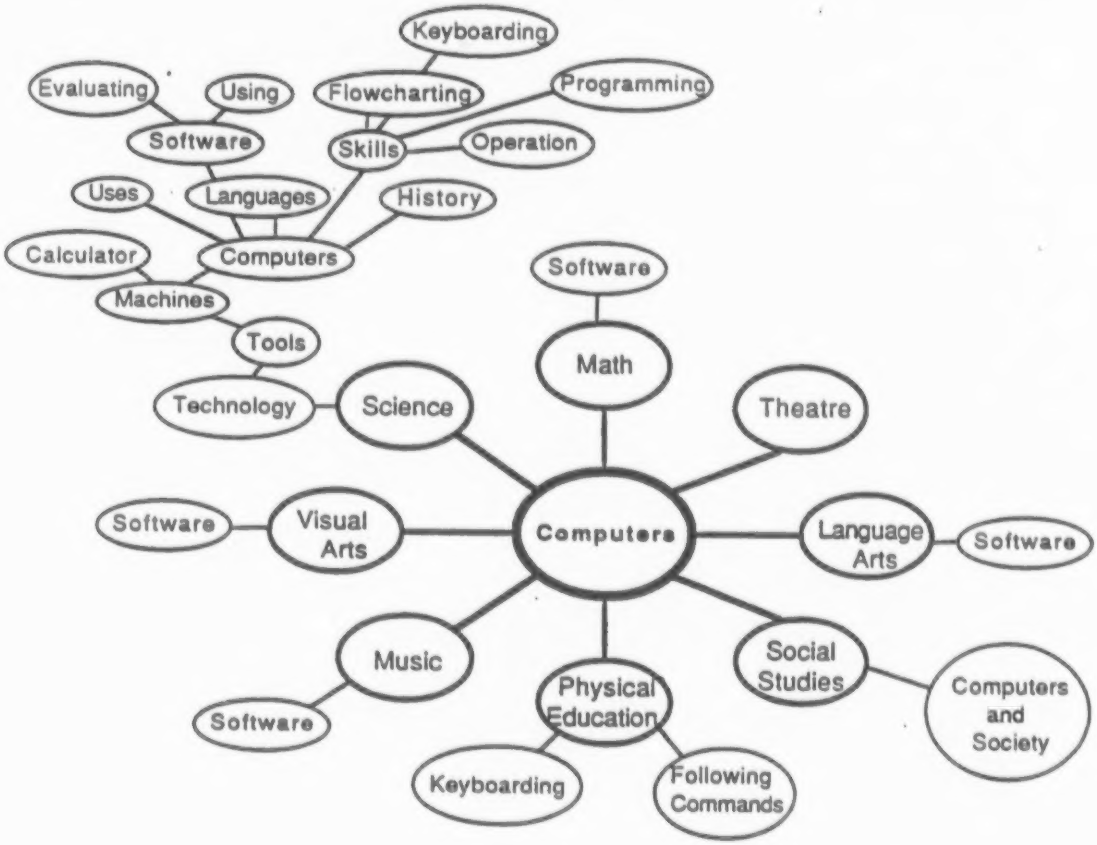
For schools with computer access a fourth thrust is the use of computer-aided instruction in many content areas (e.g. math facts drills). For more advanced students, a fifth thrust can added dealing with the computer languages (BASIC and LOGO) and computer programming.

The teacher with limited experience with computers and/or limited access to computers for her students can still design a successful unit if business/school/community partnerships are exploited. Computer companies, dealerships and service centers are all resources for this unit. Equipment demonstrations (at no cost), leasing, and short-term loans of computers can sometimes be arranged. Businesses using computers can contribute to the learning experience by arranging speakers, field trips, etc. for the "computers in society" emphasis. Parents with computers can also serve as resources.

Exactly because the "computer" unit is not a traditional part of the elementary science curriculum, it will be exciting and meaningful to the students. Channeling their motivation and interest, the teacher can develop both science content and process skills and the skills necessary for independent learning simultaneously .

Visual Organization of Topics

Note: Below is a sample only. Your students should generate a web of ideas either at the beginning of the unit (to spur research questions) or at the end of the unit as a closure activity. Students may generate one web or may each do a web to be posted for comparison.


Keyboarding
Evaluating
Using
Flowcharting
Programming
Software
Skills
Operation
Uses
Languages
History
Calculator
Computers
Machines
Tools
Software
Math
Technology
Science
Theatre
Software
Visual Arts
Computers
Language Arts
Software
Music
Physical Education
Social Studies
Computers and Society
Software
Keyboarding
Following Commands

Short Term Objectives

Beginner

1. The student will tell what a computer is and what it can do.

2. The student will list uses for computers in his community.

3. The student will develop keyboarding skills for the use of commercial software.

4. The student will sample at least 15 pieces of software.

5. The student will participate in class discussions about computers and their uses.

6. The student will explore the use of LOGO, BASIC, or computer graphics commands.

7. The student will increase his reading/speaking/listening/writing vocabularies by 50 words.

8. The student will use words in the vocabulary list correctly 70% of the time.

9. The student will be able to safely operate a micro computer.

10. The student will name the main parts of a computer.

11. The student will develop new sequencing skills.

Advanced

1. The student will list the uses of computers in our society.

2. The student will explain the advantages and disadvantages of using computers.

3. The student will identify different types of computers and list several peripheral devices.

4. The student will identify and describe pre-computer aids to calculation.

5. The student will describe contributions of a specific person to the history of the computer.

6. The student will list everyday applications of computers in his life.

7. The student will use a variety of software packages successfully and evaluate them.

8. The student will recognize flow-charting and read a flow chart.

9. The student will further explain the importance of logic and apply it to programming problems.

10. The student will predict future applications of computer technology.

11. The student will learn the syntax of the BASIC language.

12. The student will write a program in BASIC.

13. The student will explain some problems in society caused by the use of computers.

14. The student will recognize and explain binary numbers.

Field Trip Ideas

1. Visit a business or educational institution that has large main-frame computers. Talk about differences between large computers and personal computers (P.C.'s).

2. Visit a museum of science and technology to see examples of machines from the past. Stress the improvement of technology by succeeding generations.

Speaker Ideas

1. Invite a salesman or manager of a computer store or software rental store to demonstrate his products and talk about new developments in computer accessories.

2. Invite a hacker to show the use of a modem, a mouse, a light pen, a koala pad, a voice synthesizer or other peripherals he uses.

3. Invite a programmer, a data base specialist or a systems analyst to talk about careers in the computer field.

4. Invite a panel of people who use computers in their work to talk about how computers have changed their jobs.

5. Invite a computer repairman to show the children the "insides" of a computer. Ask him to bring schematics of the circuit board and other visuals.

6. Invite a professor of computer science to talk about artificial intelligence.

Bulletin Board Ideas

1. At the beginning of the unit post these sentences. Talk about what the class will learn in the next 2-4 weeks. Ask how they feel about the objectives. Ask for suggestions of other objectives or activities they would like to include. Use the bulletin board in class discussions and planning activities (e.g. unit calendar).

GOAL

Learn all we can about computers.

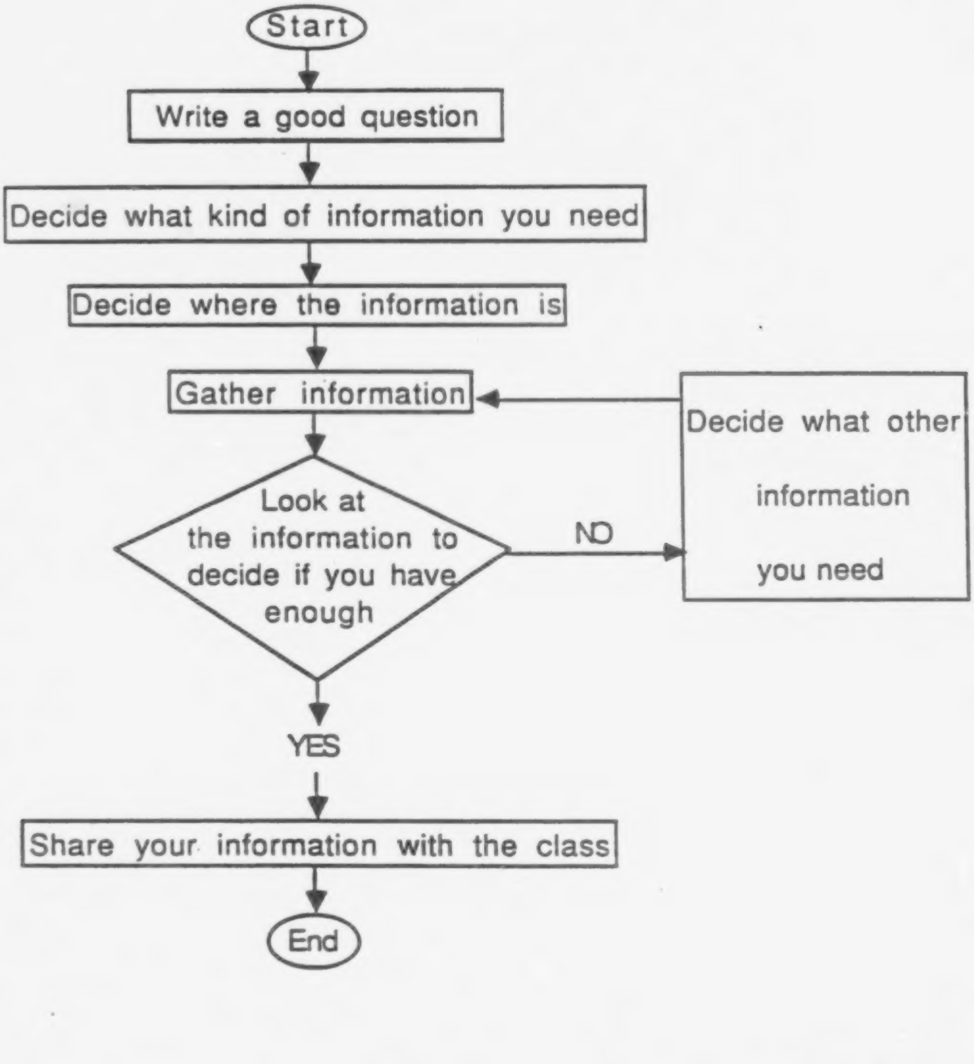
OBJECTIVES

Learn new words.
Use new software.
Learn some commands.
Write a program.
Do graphics.

ACTIVITIES

Talk and read about computers.
Have computer time every day.
Get a mentor or tutor to help with programs or graphics.
Go see main-frame computers.

2. On a bulletin board or poster, make this flow chart. Refer students to it as they do their independent research on computer topics. If possible, give them each a copy of it to track their progress.


Start
Write a good question
Decide what kind of information you need
Decide where the information is
Gather information
Look at the information to decide if you have enough
NO
Decide what other information you need
YES
Share your information with the class
End

3. On a piece of paper, draw a timeline going from 1600 to 2000 A.D. Using the following list of events, pick two or more events from each century and place them on the timeline. Next add some personal data, such as birthdays of people you know. Now select at least six events from the development of the computer and place them on the timeline.*

1696	The first practical steam engine is invented.
1709	The modern piano is invented.
1776	The Declaration of Independence is signed.
1825	The first passenger train goes into service in Great Britain.
1868	Sholes and Glidden invent the typewriter.
1876	Alexander Graham Bell invents the telephone.
1891	Basketball is invented.
1896	Coca Cola is first produced and marketed.
1920	Commercial passenger airline service begins.
1923	The first electronic pickup for a guitar is patented by Lloyd Loar.
1928	Mickey Mouse is created.
1934	Televisions are sold to the public.
1955	McDonald's grows into a chain restaurant.
1955	Disneyland opens.
1957	The Soviet Union puts the first man-made satellite, Sputnik, into orbit.
1969	The U.S. lands the first man on the moon.
1976	Viking I & II land on Mars and relay information to Earth.

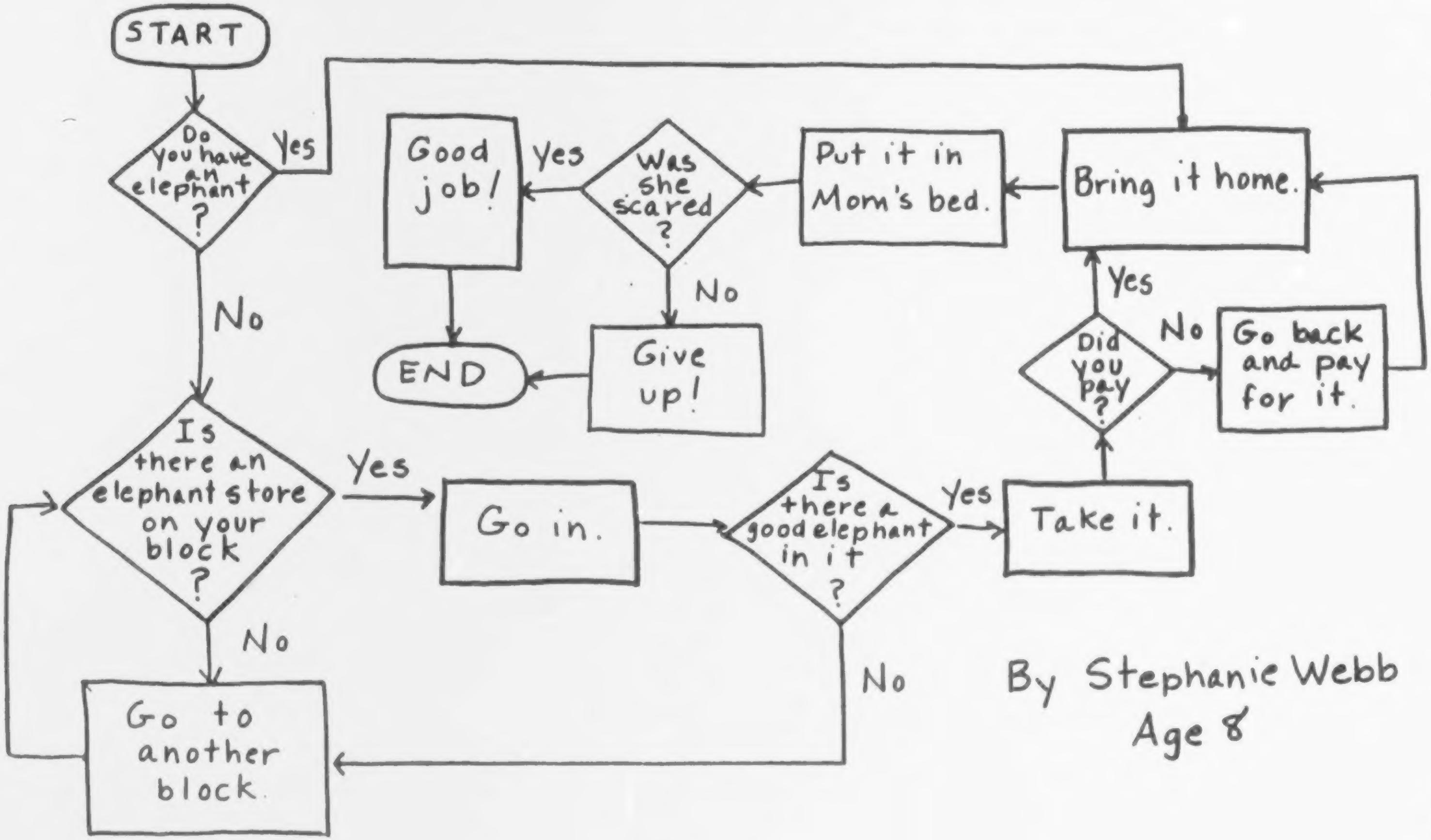
* If possible, have students choose six events they have found during their reading or research.

Source: ________________. (1981). Computer Discovery. Chicago: SRA.

4. Post flow charts for several activities. (Note: see page 13 for "How to scare your mom with an Elephant" flowchart.) These examples can serve as models for the children's reference when doing original ones. After the flow charts have been posted for a week, take each down, disassemble it and ask the class to reassemble it correctly. Examples: Brushing Your Teeth, Eating in the School Cafeteria, Washing Your Dog.

5. Obtain samples from several printer types (daisy wheel, dot matrix, laser, etc.). Note: These samples can be obtained from computer sales people or perhaps the children's relatives. Compare the quality of print and graphics capabilities if possible.

How to Scare Your Mom with an Elephant


START
Do you have an elephant ?
Yes
No
Is there an elephant store on your block ?
Yes
No
Go to another block.
Go in.
Is there a good elephant in it ?
Yes
No
Take it.
Did you pay ?
No
Go back and pay for it.
Yes
Bring it home.
Put it in Mom's bed.
Was she scared ?
Yes
Good job!
No
Give up!
END

By Stephanie Webb
Age 8

Snack Suggestions

1. Anything "byte"-sized. Discuss bytes and bites.
2. Serve kilobyte (thousand) sizes of something (e.g. Cheerios). Ask them what a megabyte meal (a million bytes) would be.
3. Bits: of cheese or ham, etc. Compare and contrast bits and bites.
4. Chips: talk about silicon and silicon chip manufacturing.
5. Pass out menus at snacktime and have the children make a choice. Discuss computer software menus.

Play Group Ideas

1. Arrange for children to use a computer lab at a school on Saturday or a computer store's demonstration models after closing. Ask everyone to bring software to share.
2. Pair children without computers to children with P.C.'s at home. Arrange short visits to both houses for each child.
3. Arrange a visit to an electronic arcade for a short time. (This activity can be paired with a shopping trip to a mall computer store perhaps.) Note: If money is a problem for any member of the group, do a money-making project (aluminum can collecting perhaps) to finance the trip.

PARENT LETTER

Note: This letter should be composed by the students after the class goals are set. Explain the purpose of the letter and let children write it. Points that should be included in the letter are: a) what the children will study; b) how parents can help at home; and c) any special activities or events that will be a part of the unit. Enter it into the computer and print out copies for proofreading and editing by the group. (Note: Let children watch you or the secretary make changes.) If you are good at graphics, add borders or other designs. Discuss electronic mail, FAX, etc. as you do it. If any parents have a computer, send the letter by modem!

COLLEAGUE LETTER

DATE______________________

Dear Colleague,

Our current unit on computers and calculators marks a wonderful milestone for our students. They are beginning as of today to direct their own learning.

With guidance, of course, they will be designing this unit themselves! After a brief introduction to the subject, they will be:

1) deciding what questions they have about computers and calculators;
2) deciding where they can go to get these questions answered;
3) making a list of field trips and speakers they would like to arrange;
4) choosing activities for this month's classes; and
5) writing some of the questions for our unit evaluation.

Because they are planning this unit with me, I cannot tell you exactly how we might cooperate on this unit of study. However, as our plans develop, we will certainly keep you informed. Perhaps you could ask the children from your room to suggest or supply activities for some of your centers. Also please share any ideas you might have about our unit with them too, as I am trying very hard to give them "ownership" of this month's study.

In addition to teaching planning skills and research skills, this unit will encourage their independence and their leadership skills. I am also hoping to have real growth in their group social and communication skills.

As always, thanks for your help.

Sincerely,

PRE-TEST

Note: Read aloud for all children.

Choose the best answer for each.

Beginner

1. Clearing the screen erases a program from the computer's memory.

   a. true
   b. false

2. What is the ancient Chinese device that helped people calculate?

   a. Abacus
   b. Stepped Reckoner
   c. Tabulating Machine

3. When were computers first made to be sold to companies?

   a. 1950's
   b. 1990
   c. 1840

4. Which job would *not* be suitable for a computer in a department store?

   a. Calculate customers' bills.
   b. Process paychecks.
   c. Handle customers' complaints.

5. If your computerized bill has an error, it was probably a

   a. mistake made by a computer.
   b. mistake made by a person.
   c. poor electrical connection.

6. A person who services and repairs computers is a

   a. sales representative.
   b. computer technician.
   c. software librarian.

7. What type of computer system would a major airline use to schedule its flights and make reservations on its flights?

   a. mainframe computer
   b. minicomputer
   c. microcomputer

8. Choose the true statement.

   a. Computers need instruction in order to solve problems.
   b. Computers have brains.
   c. Computers are smarter than humans.

9. Computer programs are referred to as

   a. software.
   b. hardware.
   c. microprocessors.

10. The number system used by computers is called the

   a. binary number system.
   b. decimal number system.
   c. metric system.

Advanced

1. A microcomputer's ability to display pictures and graphs is referred to as

   a. programming.
   b. computer graphics.
   c. text display.

2. The copying of commercial software is both unethical and illegal.

   a. true
   b. false
   c. sometimes

3. Which of the following is true for a microcomputer?

   a. It can do many jobs at the same time.
   b. It can fit on a desk and can be moved.
   c. It costs over $100,000.

4. Which of the following is a computer language?

   a. English
   b. BASIC
   c. RAM

5. A computer program is

   a. a computer chip.
   b. a peripheral output device.
   c. a set of instructions that tells a computer what to do.

6. Which of these items is not a peripheral?

   a. mouse.
   b. modem.
   c. mother board.

7. Which command tells the computer to store a program in its memory?

   a. GOTO.
   b. SAVE.
   c. END.

8. A flow chart is used to . . .

   a. plan a program before you write it.
   b. check a program for "bugs".
   c. Both a and b.

9. Which of these statements is true?

   a. A computer can do everything a calculator does.
   b. A calculator can do everything a computer does.
   c. A calculator and a computer are exactly the same.

10. Computers can

   a. replace man.
   b. be creative.
   c. do boring work quickly.

Exploratory Activities

General Examples of Activities for this Unit

EXPLORATORY ACTIVITIES

1. Generating questions about computers.
2. Trying new software.
3. Listening to resource persons on computer-related topics.
4. Watching parent volunteers work on computers.
5. Taking field trips to see computers at work.
6. Skimming books, magazines and catalogs about computers.
7. Reading examples of short programs and looking at their printout.
8. Searching for materials about computers in a bookstore, computer store, etc.
9. Interviewing people with computer-related careers.
10. Making a web, diagram, timeline or flowchart for information found during this unit.
11. Diagramming a computer system, flowcharting a program, or organizing data visually.
12. Exploring computer graphics.
13. Doing binary puzzles or games.
14. Doing calculator activities or games.

GUIDED ACTIVITIES

1. Having mentors from 4th or 5th grade teach a specific computer skill such as graphics.
2. Reading books (including paperbacks or comic books) about computers.
3. Doing commercially-prepared activities about calculators.
4. Choosing and completing task cards on computer operation or safety.
5. Completing contract work on vocabulary words.
6. Choosing and completing folders on binary numbers.
7. Choosing and completing work folders on flow charting.
8. Using computer-aided instruction to develop keyboarding skills.
9. Logging a specified number of work hours on the computer.
10. Evaluating several kinds of software.
11. Writing or debugging programs.
12. Using utilities to generate products for contracts.
13. Using different kinds of peripherals.
14. Completing logic or sequencing activities
15. Researching topics or questions for independent study at the library.

Examples of Class Decisions Needed for Planning this Unit

1. What questions do we have about computers?
2. Which questions do we want answered?

3. Do we want to have speakers?
4. Who do we want to invite? When?

5. How will we schedule computer time?
6. Which activities will we do when we cannot be on the computer?

7. Where in our community are there computers?
8. Do we want to go on a field trip?
9. When could we go and how much will it cost?

10. How will we learn all the vocabulary?
11. How will we know if we learned this information?

Sample Questions Which Might Be Generated by Students

What is a tool?
What is a machine?
What is the purpose of a machine?
Where do machines come from?
Name machines in your house.
Name machines in our school.
What do machines help us do?
What are thinking machines?

Where do machines get energy to do work?
What does electronic mean?
What are the parts of the computer called?
Why does the computer need wires?

How do computers talk to each other?

Do computers recognize different people?
Will it explode? Will it shock me?
When it "crashes", is it broken?
Why won't it run any program I want (i.e. "Space Invaders") right now?
Why doesn't our computer talk?

What is the difference between a calculator and a computer?
What is the difference between a P.C. and a main frame?

How does a computer know what to do?
Can computers make mistakes?
Do humans operating computers make mistakes?

What is data?
How do humans input data? How does the computer communicate output data?

What are some things you should never do with a computer (or to it)?
What are some things you should always do with a computer (or to it)?

How much does a computer cost?
Where can you get a computer?
What are some different companies that manufacture computers?

Why must commands be logical?
Why must commands be sequenced correctly?

How are computers and brains alike?
How are computers and brains different?
Do machines have brains?

What kind of jobs do computers do best?
What are some things computers can't do?
Why do a man and a computer make a good team?

SAMPLE UNIT CALENDAR

	MON.	TUES.	WEDS.	THURS.	FRI.
Week # 1	Class Planning	Class Planning	Class Planning	COMPUTER LAB ON THURSDAYS	Contracts must be signed.
Week # 2	Speaker	Field Trip	Vocabulary Contract Due		Software Evaluation Due
Week # 3	Speaker	Field Trip	Vocabulary Contract Due		Report Due
Week # 4	Folder Activities Due	Class Discussion	Final Vocabulary Test		Program Due Unit Evaluation Discussion

Note: Individual calendars should be filled in by students and a master calendar should be kept by the teacher. Separate calendars may be needed for classes with both beginning and advanced computer students.

INVENTORY FOR INDEPENDENT LEARNERS

Note: This assessment can be used as a pre-/post-description of the child's abilities to do autonomous learning. It can also be completed by the child as a self-evaluation.

DOES HE OR SHE:	YES	NO	UNKNOWN
Use free time wisely?			
Make choices for centers well?			
Choose independent activities and complete them?			
Write goals for self?			
Choose activities to meet goals?			
Make plans well?			
Complete plans successfully?			
Work alone productively?			
Seem motivated to do self-directed projects?			
Possess sufficient study skills for contract work?			
Possess sufficient research skills for contract work?			
Evaluate his/her progress toward goals accurately?			

COMPUTER LOG

NAME: ____________________ CLASS: ______________________________

DATE	SOFTWARE	TIME IN	TIME OUT	TOTAL TIME	COMMENTS

SOFTWARE EVALUATION SHEET

My Name ______________________________

Date ______________________________

Software Name ______________________________

Type of software:
__game __tutorial __utility __drill

What does this piece of software do?
__entertain __teach __other ____________

Write a short description of it, please.

____

____

____

Please rate the software below.

Overall rating
__Easy to use __Average __Hard to use

Reading level
__Easy __Average __Hard

Directions
__Clear and easy to understand __Confusing or difficult

Speed
__Too fast __Just right __Too slow

Graphics
__Great __Good __Poor

Other Comments: ____

____

____

____

Note: Ideally the children should design this checksheet. A discussion about their likes and dislikes of certain software could lead to such a form. After preliminary discussion, make a rough draft of their form. If possible have the children watch someone enter it on the screen, revise it and print it out.

CONTRACT FOR VOCABULARY WORDS

Name of teacher ____________________
Name of student ____________________
Date starting ____________________
Date ending ____________________

I will learn __________ new computer words this week. The words I will learn are written on the back of this page. On Friday, ___(Date)___, I will be able to say them, spell them and tell what they mean. To learn these words, I will do these activities:.

1. ____________________
2. ____________________
3. ____________________
4. ____________________

On Friday, I will show you that I learned the words by __________

____

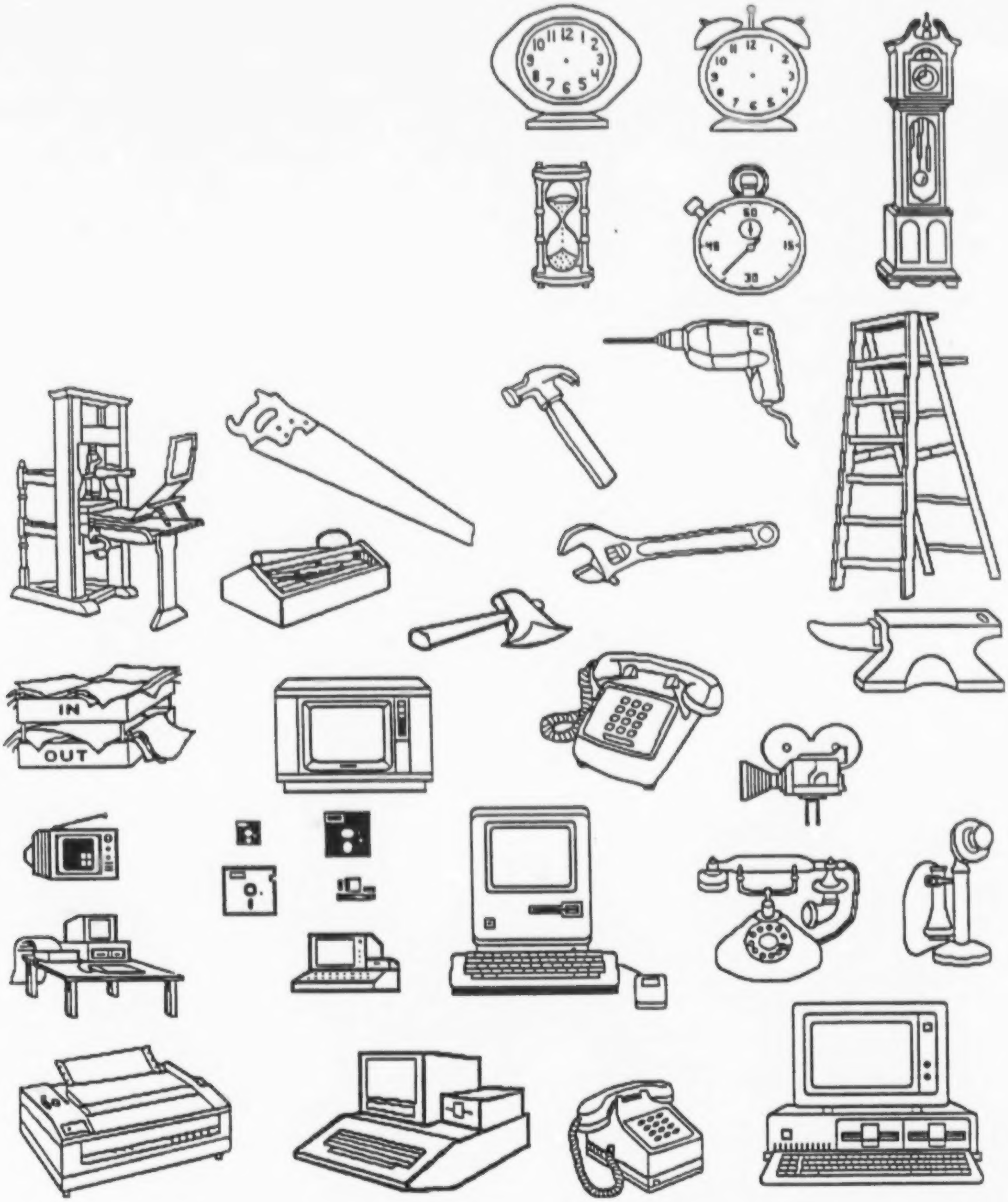
____

____

Note: In order to facilitate the children's work, teachers must (1) list many vocabulary words to choose from; (2) list acceptable activities to choose from; (3) supply all materials and offer assistance when needed; (4) ask children mid-week about their progress; and (5) offer optional forms of evaluation.

Free and Inexpensive Teaching Resources

Radio Shack A Division of Tandy Corp. (Longview and Tyler Stores)	Free Comic Book Series including "History of Electronics" and "The Tandy Computer Whiz Kids"
Computerland Keith Daniel, Educational Coordinator 1905 N.W. Loop 281 Longview, TX 75604 214-297-0145	Catalogs & Brochures, Curriculum Software Guides ($20), Software Demos, Apple & IBM Educational Materials.


IN
OUT

TOPICS FOR INDEPENDENT STUDY

- Binary Numbers
- Univac or Eniac
- Admiral Grace Hopper
- Steven Jobs and Stephen Wozniak (Apple Creators)
- Computer Animation
- Computer Music
- Charles Babbage
- J. Presper Eckert
- Electronic Mail
- Electronic Funds Transfer
- Semiconductor
- Napier's Bones
- Cray

QUESTIONS

1. Who invented the computer? When was the computer invented?
2. Do cars have computers?
3. What do these letters stand for...CPU CRT RAM ROM UPC?
4. Where is Silicon Valley?
5. What is a dwarf computer? What is a super computer?
6. How do computers help handicapped people?

Closure Activities.

1. Do a scavenger hunt collecting items (listed on page 35) related to computers. Include members of the students' regular classrooms or homerooms on the hunt. Display the items in a central hallway or on a bulletin board with the name of each person who collected it.

2. Write (or have a parent write) a computer program which will list the names of your class or print greeting cards or signs for them. Have each student enter a few commands. (Perhaps they could type the commands which pertain to their name). Have an advanced student debug the program. Showcase it on the last day of the unit and print out the cards or signs. Also, give them a listing of the commands required to do the job.

Scavenger Hunt

Put into a folder as many of the items listed below as you can find. If you think of others items that use computers or that are associated with computers, include them in your collection. Bring them to school for display.

__ computer printed grocery tape

__ computer printed utility bill

__ computer printed phone or department store bill

__ magnetic tape used by a computer

__ receipt from an automated bank teller

__ computer-generated airline ticket

__ sample of the universal product code

__ computer-generated letter ("junk mail")

__ library card with a universal code

__ punch card

__ paper tape used by a computer

__ computer-generated new car sticker

__ computer printout from an auto analysis

__ advertisement for an appliance containing a computer

__ album cover from computer generated music

__ album cover from computer processed music

__ ad for a calculator that uses a computer

__ newspaper or magazine article on computers

__ drawing or photo of computer games found in a pinball arcade

__ ad for toys that have computers

__ fare card for a computer controlled public transportation system

__ computer printed photo

Source:________________. (1981). Computer Discovery. Chicago: SRA.

UNIT EVALUATION

Note: Students should be allowed to choose how they will be evaluated if possible. They may also be asked to evaluate themselves or each other.

1. Have each child take a computer operation test (much like a driving test). Ask him/her to do these things: a) correctly insert a disk; b) boot it up; c) use a menu; d) change disks; e) turn the computer off properly. Other tasks may be added for advanced students.

2. Ask each student to submit one or two questions for a unit test. The test might cover programming, flow charting, vocabulary or history.

3. Have each advanced student choose a different evaluation product. Some of these products might be:
   a) an oral or written review of a piece of software;
   b) an original computer program;
   c) a series of computer graphics.

4. Have the class collaborate on a computer dictionary, Assign a number of words to each student. Organize it on a software program and print it. If possible, have a high school student program it as a tutorial to be used by next year's class.

5. Have a group produce a video for other classes to view on computer operation and safety.

6. Conduct a class discussion on whether the unit was successful in achieving the goals chosen.

VOCABULARY

access
acronym
application
artificial intelligence
backup
barcode
basic
binary
bit
board
bug
byte
cable
career
catalog
circuit
command
computer
computer science
crash
cursor
data
data base
debug
disk
disk drive
diskette
electric
electronic
enter
evaluate
file
floppy disk
flow chart
GIGO
graph
graphics
hacker
hard disk
hardware
information
input
interface
joystick
keyboard
kilobyte
koala pad
language
light pen
logic
logo
machine
main frame
manufacture
megabyte
menu
minicomputer
modem
monitor
mouse
network
on-line
output
password
peripheral
printer
program
programmer
RAM
ROM
run
save
screen
sequence
silicon
society
software
store
supercomputer
system
technology
terminal
tool
UPC
voice synthesizer

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Suggested Software

Utilities
Bank Street Writer
Kidwriter
Print Shop
Toy Shop

Computer Skills
Mastertype

Visual Arts
Delta Drawing

Science Operation: Frog
The Digestive System:
The Disappearing Dinner
Fantastic Animals

Social Studies
Uncle Sam's Map
Stickybear Townbuilder

Math
Stickybear Math I & II
Fish Scales
Dragon Mix
Demoition Division
Bumble Games
Estimation
Monkey Math

Language Arts
Stickybear Spellgrabber
Story Maker

Problem Solving & Logic
Juggles' Rainbow
Gertrude's Secrets
Gertrude's Puzzles
Rocky's Boots
Moptown Parade
Moptown Hotel
Snoopertroops #1 & #2
Dragon's Keep

Appendix

Computer Literacy Scope and Sequence

Source: Electronic Learning, p. 62.

Legend: IA- Introductuion with Activities
ID - Introductory Discussion
C - Expansion os Discussion from Previous Grades
R - Review
M - Mastery

	TOPICS	COMPUTER AWARENESS K	1	2	3	4	5	PROGRAMMING K	1	2	3	4	5
K	What a Computer Is	IA	C	C	C	C	C						
	Following Directions	IA	C	C	C								
	Vocabulary	IA	C	C	C	C	C						
	Programming Programmable Devices							IA	C	M			
	Turtle Graphics (Making Shapes)							IA	C	C			
1ST GRADE	What a Computer Can Do		IA	C	C	C	C						
	Learning to Use A Computer		IA	C	C	C	C						
	Using the Keyboard		IA	C	C	M							
	Turtle Graphics (Moving Shapes)								IC	C	C		
2ND GRADE	Computer Advantages			IA	C	C	C						
	Computer Disadvantages			IA	C	C	C						
	Computers in Our Lives			ID	C	C	C						
	Everyday Applications			ID	C	C	C						
	Future			ID	C	C	C						
	Turtle Graphics (Rotations, etc.)									IA	C	C	C
	LOGO (Sprites)									IA	C	C	C
3RD G	History				ID	C	C						
	Logic				IA	C	C				IA	C	C
	How a Computer Works				IA	C	C						
	Parts of a Computer				IA	C	C						
	LOGO Programming										IA	C	C
	Problem Solving with LOGO										IA	C	C
4TH GRADE	Hardware					ID	C						
	Software					ID	C						
	Flowcharting					IA	C						
	Storyboarding					IA	C						
	BASIC: PRINT & REM											IA	C
	BASIC: LET											IA	C
	BASIC: INPUT											IA	C
	BASIC: GO TO											IA	C
	Formulas (Variables & Constants)					IA	C					IA	C
	String Data											IA	C
	Relations					IA	C					IA	C
	Binary Numbers					IA	C						
GRADE	Computer Generations						ID						
	Counters						IA						IA
	BASIC: IF-THEN												IA
	BASIC: ON-GO TO												IA
	BASIC: READ-DATA												IA
	Word Processing						IA						